A COMPARATIVE ANALYSIS OF SURGICAL MANAGEMENT USING EXTERNAL FIXATION AND INTERNAL FIXATION IN UNSTABLE COMMINUTED FRACTURE OF DISTAL RADIUS

DISSERTATION

SUBMITTED TO

THE TAMIL NADU DR. M.G.R.MEDICAL UNIVERSITY

IN PARTIAL FULFILMENT OF THE REQUIRMENTS FOR THE AWARD OF THE DEGREE

OF

M.S. ORTHOPAEDICS

BRANCH II (COURSE CODE 2202)

APRIL 2016

DECLARATION BY THE CANDIDATE

I hereby declare that this Dissertation / Thesis entitled : **"A Comparative Analysis of Surgical Management Using External Fixation and Internal Fixation in Unstable Comminuted Fracture of Distal Radius"** is a bonafide and genuine research work carried out by me under the guidance of **Dr. S.Rama Guru,** Professor Department of Orthopaedics, SreeMookambika Institute of Medical Sciences, during the period 2013 – 2016 in partial fulfillment of the requirements for the award of degree of M.S. in Orthopaedics, by the Tamil Nadu Dr. MGR Medical University, Chennai – 600 032.

Place :Kulasekharam

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CERTIFICATE

This is to certify that this dissertation entitled **"A Comparative Analysis of Surgical Management Using External Fixation and Internal Fixation in Unstable Comminuted Fracture of Distal Radius"** is a bonafide research work done by **Dr. T. Vishnu,** under the guidance and supervision during the period 2013 – 2016 in partial fulfillment of the requirements for the award of degree of M.S. in Orthopaedics by the Tamil Nadu Dr. MGR Medical University, Chennai – 600 032.

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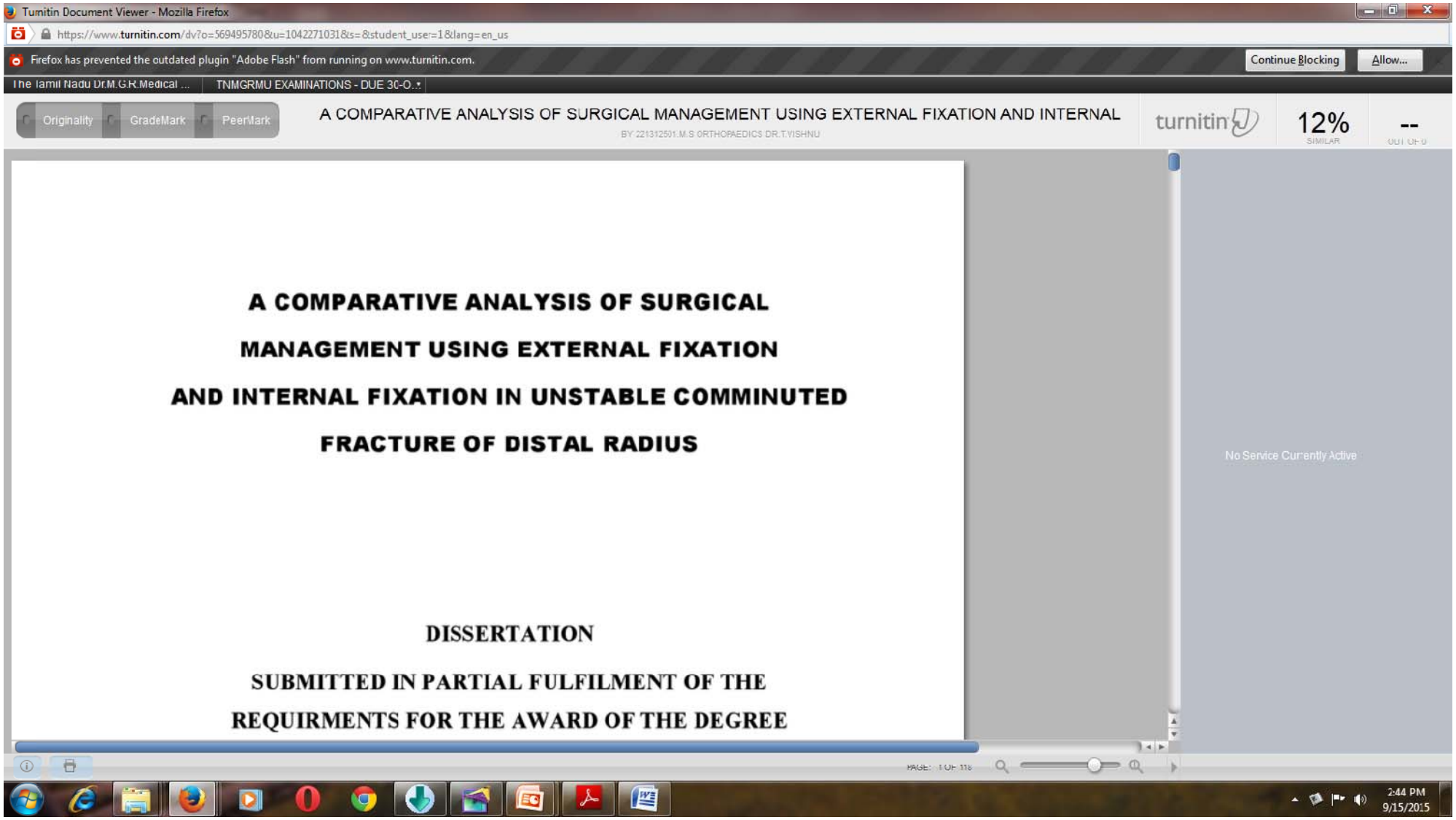

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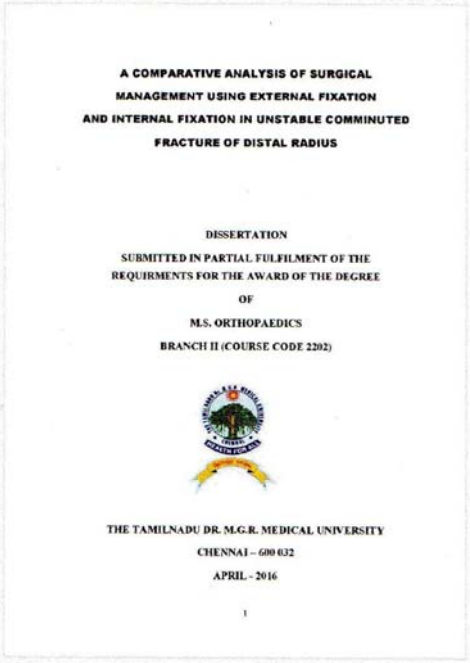

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My deepest gratitude to all my **Patients** without whose whole hearted cooperation, this thesis would not have reached a conclusion.

Above all, my thanks to the **Almighty** for blessings and for making this a possibility.

CONTENTS

ABSTRACT

TITLE

A comparative analysis of Surgical Management using External fixation and Internal fixation in unstable comminuted fracture of distal Radius.

BACKGROUND

Comminuted Intra-articular fractures of distal radius are one of the commonest fractures occurring in Adults.

Fractures of these type are difficult to manage by conservative Methods

Surgical Techniques such as External fixation and Internal fixation are used effectively in Management of comminuted unstable fractures of distal Radius.

External fixation Surgical procedure is done using Schanz pins and screws.

Open Reduction and Internal fixation Surgical procedure is done using K wire, buttress plates and locking compression plates.

AIMS AND OBJECTIVES

To compare the effects of External fixation and internal fixation in Surgical Management of unstable comminuted fracture of distal radius.

To evaluate functional results, advantages, disadvantages and complications of external and Internal fixation in treatment of unstable comminuted fracture of distal radius.

METHODS

This is a prospective study, non randomized study, study period includes January 2014 to September 2015.

68 patients were included in the study. 34 patients underwent Internal fixation and 34 patients underwent External fixation.

Functional outcome of the patient was assessed using DASH (Disability of the Arm, Shoulder and Hand) Method.

RESULTS

The difference in functional outcome of patients with comminuted unstable fractures of distal radius treated with surgical techniques such as External fixation and Internal fixation was not found to the statistically significant (P = 0.3955)

In our study, sex of patient, Age of patient, side involved, Mode of Injury, Type of fracture were also found to be statistically insignificant in determining functional outcome of patient.

CONCLUSION

The current study shows in surgical treatment of comminuted unstable fractures of distal radius, both external fixation and Internal fixation shows equally good results.

KEYWORDS

Comminuted unstable fracture of distal Radius

Open Reduction and Internal fixation

External fixation

Frykman classification

DASH (Disability of the Arm, Shoulder and Hand) Method

INTRODUCTION

Fractures of distal end of radius are commonest fractures presenting to Orthopaedic outpatient Department and Emergency. It accounts for about One Sixth of all fractures treated in emergency rooms[1]. Fractures of distal end of radius are caused due to fall on an outstretched hand. Unstable comminuted fractures of these type occur due to high velocity Injuries.

It occurs commonly in both youngerand elderly population due to Road traffic accidents and fall and in females common in postmenopausal period.

Uncomplicated fractures of this type can be treated with closed reduction and immobilization in a cast, however, unstable comminuted fractures of radius occurs as a treatment challenge.

Review of Literature shows high incidence of unsatisfactory results in treatment of unstable fractures by plaster cast method, It causes deformity up to 60% and unsatisfactory results in 32% of patients[2].

In recent years, due to advancement of Surgical techniques, External fixation and internal fixation are widely used as conservative methods fail to maintain anatomical and functional stability.

External skeletal fixation uses minimally invasive procedures with reduction by ligementotaxis.

Both static and dynamic external fixators are used, depending upon difficulty in maintaining radial length and alignment.

Internal fixation are increasingly used as it directly controls and maintains Anatomical and functional stability of wrist joint. Locking compression plates K-Wires and volar buttress plates are widely used in this method. Now a days latest methods like interlocking nailing, fragment specific fixation using plates and clamps are used.

The purpose of this dissertation is directed towards evaluating functional outcome of patients with comminuted unstable fractures of distal radius treated with External fixation and internal fixation.

AIMS AND OBJECTIVES

To compare the effects of external and internal fixation in surgical Management of Unstable comminuted fracture of distal Radius.

To evaluate functional results, advantages, disadvantages and complications of external and internal fixation in treatment of unstable comminuted fracture of distal Radius.

REVIEW OF LITERATURE

Abraham colles on (1814)[3] first published on fracture of Carpal extremity of radius in Edinburgh Medical Journal. “This fracture takes place about an inch and a half above carpal extremity of radius. If the surgeon holds his hands in that of patients and exerts even a moderate force the limbs instantly return on extension on being removed”.

Till 1920 treatment of colles fracture was forceful \traction, manipulation and immobilization of wrist in flexion. It lead to a high incidence of Median nerve Neuropraxia.

After 115 years, Bohler[4] in 1929 published Tran’s fixation technique with skeletal pins and plaster cast. The pin and plaster method showed good results than old method.

In 1944 Roger Anderson and Gordon O’[2] described new method of reduction through skeletal traction and counter traction and immobilization by use of two slender rods instead of plaster of Paris cast.

Depalma (1952)[5] described ulnar pinning where K-wire was introduced through ulna into reduced distal fragment of radius. It showed 18% unsatisfactory results. But with this method Dowling and sawyer (1961) showed 84% good and excellent results.

Ellis (1965)[6] recommended open reduction and Internal fixation of unstable smith's type (or) Volar Barton fractures. He devised 'T' shaped plate, as volar buttress preventing deformity.

Green D.P. (1975)[7] reported 86% good to excellent results with pin and plaster technique.

Cooney W.P. (1979)[8] reviewed Roger Anderson external fixator by showing 90% excellent and 8% fair results in comminuted intra-articular fractures. He found articular congruity and residual dorsal tilt were most significant criteria affecting results.

Charles Melone (1986)[9] proposed open reduction of displaced intra-articular fractures of distal radius. He proved that maximal functional recovery of fracture is dependent on accurate and stable restoration of articular surfaces. These fractures have four basic components. Radial styloid, Radial shaft, dorsal and volar Medial fragments.

The Medial fragments possess strong ligamentous attachments to carpus and ulnar styloid, they together constitute Medial complex. On basis of displacement of medial complex, he has classified four types. First two types amenable to closed manipulation or skeletal traction. Type 3 and 4 are associated with grossly volated fragments which are absolute indication for open reduction and internal fixation. He prefers K wire fixation.

Dennis Foster (1986)[10] showed Hoffmann and Anderson showed equally good results. But 4% to 6% cases showed pin tract infection, 10% showed persistent pain and 8% showed wrist weakness.

In 1986 jerry L. Knirk et al[10] from Massachusetts Published a paper on Intra articular fractures of distal radius in young adults. All fractures were of Frykman's type VII or type VIII. They suggest external fixator is the treatment of choice.

ClyburnT.A. (1987)[11] showed new dynamic external fixation allows wrist movements and full movements of fingers. The results is early rehabilitation. It is based on Principle of having ball type of joint on fixator in par with physiological center of rotation (in proximal capitates) allows motion and maintains distraction force. He showed good results when combined with limited external fixation

esp for "diepunch" or radial styloid fragment.

Keating J.F., et al, (1994)[12] studied 79 patients with volar displaced fractures of distal radius over 26 months with A0 T-plate and showed malunion defined as more than 2mm of radial shortening more than 4mm of radial shift more than 15 degrees of volar tilt, more than 2 mm of radial shortening, more than 10mm of dorsal tilt, most patients achieved acceptable function with buttress plate is good means of treating volar displaced fracture of distal radius.

Roger Anderson (1994)[13] described prototype of External fixator used now for comminuted fracture of distal radius. He showed the causes of poor results are shortened radius,maltilted fracture of distal radius. He showed shortening was not only due to impaction and overriding but also due to crushing of Juxta – articular cancellous bone and devised fixator that maintained sustained fraction and maintained reduction. It showed good results especially in early osteoporotic bones.

Frederick A. Kaempffe et al (2000)[14] retrospectively studied 19 patients with distal radius fractures, treated with internal fixation and supplement K wire fixation over 6 years. This is found to be good method of treating fracture of distal radius.

Abbas Emami, et al (2000)[15] treated 40 patients by insertion of external fixator half pins dorsally (other than dorso – radially) in diaphysis of radius and showed it is safer position of pins and superficial radial nerve is Preserved.

Richard A. Rogachejsky et al (2001)[16] showed comminuted intra-articular fracture of distal radius should be treated by open reduction and combined internal and external fixation, supplemented by bone grafting and plate fixation is satisfactory treatment.

David Ring et al (2004)[17] studied 25 patients with A0C3 fractures treated with combined dorsal and volar plate fixation for 25 months after injury and showed it can achieve stable wrist. Second operation for implant removal was common and there was rise of tendon related complications.

ANATOMY

SURFACE ANATOMY

This is essential for diagnosis and management of wrist injuries. When the wrist is flexed against resistance tendons that stand out prominently from radial to ulnar side areflexorcarpiradialis, Palmaris longus, flexor digitorumsuperficialis and flexorcarpiulnaris.

The Ulnar nerve and vessels are present between flexorcarpiulnaris and flexordigitoriumsuperficialis. The radial styloid is ½ inch distal to ulnar styloid. On the dorsum of lower radius is Lister's tubercle, medial to which is tendon of extensor pollicis longus.

ARTICULAR ANATOMY

The wrist joint is abiaxial type of Joint, grouped under ellipsoid variety. The bones taking parts are distal end of radius and articular disc from above, scaphoid, lunate and triquetral bone below, hence termed as a mid carpal joint. Articular surface of radius and lower surface of triangular fibrocartilage from a concave surface that is elliptical in shape. Inferior surface of radius has ridge that formtwoconcavities in the radius (ie) scaphoid and lunate fossa respectively.The proximal articular surface of scaphoid and lunate fossa respectively. The proximal articular surface of scaphoid, lunate and triquetral bones form a smooth convex surface that articulate with concave surface of lower end of radius and articular disc.[5]

The capsule covers all three bones and is reinforced by dorsal, volar, lateral and medial ligaments. The capsule is lined by synovial membrane. The joint line corresponds to a line joining styloid process of radius and ulna and is convex upwards.

Distal radioulnar joint : Uniaxial pivot joint between convex surface of ulna and concave ulnar notch of radius. They are enclosed together and held by articular disc. The capsule is lax superiorly, through which synovial out pouching called recessussacriformis in front of lower part of interosseous membrane. The pronator quadratus has interosseous artery and carpal branches of radial and ulnar artery. The nerve is derived from anterior and posterior interosseous nerves.

OSTEOLOGY

Lower end of radius is expanded and is cancellous covered with a thin layer of cortical bone. The bone at about 3/4thInch proximal to articular surface is weak and susceptible for fracture. On its anterior surface Pronator quadratus muscle is attached. The posterior surface is ridged and has grooves to accommodate wrist and finger extensor tendons.

Brachioradialis muscle is inserted little abovestyloid process of radius. Medial surface has got a concave articular facet that articulates with ulna and distal ridge, which gives attachment to base of triangular fibrocartilage. Distal articular surface of radius is concave from side to side and anteroposterior, on

the ulnar side the concave surface is quadrilateral and rough and articulates with lunate[07].The concavity on lateral aspect is triangular for scaphoid articulation. The plane of articular surfaces faces distally and slightly volarly.

Lower end of ulna is slightly expanded from the neck into small rounded head. The distal surface is flat and articulates with disc. At the base of styloid is apex of articular disc and tip of styloid gives attachment to ulnar collateral ligament.

LIGAMENTS

There are two Major groups of ligaments of the wrist.

- Extrinsic group of ligaments
- Intrinsic group of ligaments

Extrinsic ligaments link carpal bones to radius, ulna and metacarpals.

Palmar wrist ligaments Originates laterally from radial palmar facet of radial styloid and are directed in a distal ulnar direction where they meet ligaments originating medially from triangular fibrocartilage and distal ulna. It consist of two ‘V’ shaped ligamentous bands. One is proximal and connects forearm to proximal carpal row and the other is distal and connects forearm to distal carpal row. The distal limb consists of radio scaphoid capitate ligaments laterally and ulnocapitate ligament medially. The proximal limb consists of

radioulnotriquetral and radio-scaphoid ligament laterally and ulnotriquetral ligament medially.

Dorsal wrist ligaments are radiotriquetral and scaphotriquetral ligament which describe a ‘V’ shape from the dorsal aspect of radius near Lister’s tubercle to triquetrum and then back to the dorsal scaphoid rim.

Dorsal ligaments are attached to proximal carpal row and volar ligaments are attached to proximal and distal carpal row.

Intrinsic ligaments :

These are intra- articular intrinsic ligaments of wrist connecting adjacent carpal bones. They are collections of relatively short fibers that bind to bones of either proximal (or) distal carpal rows to each other.

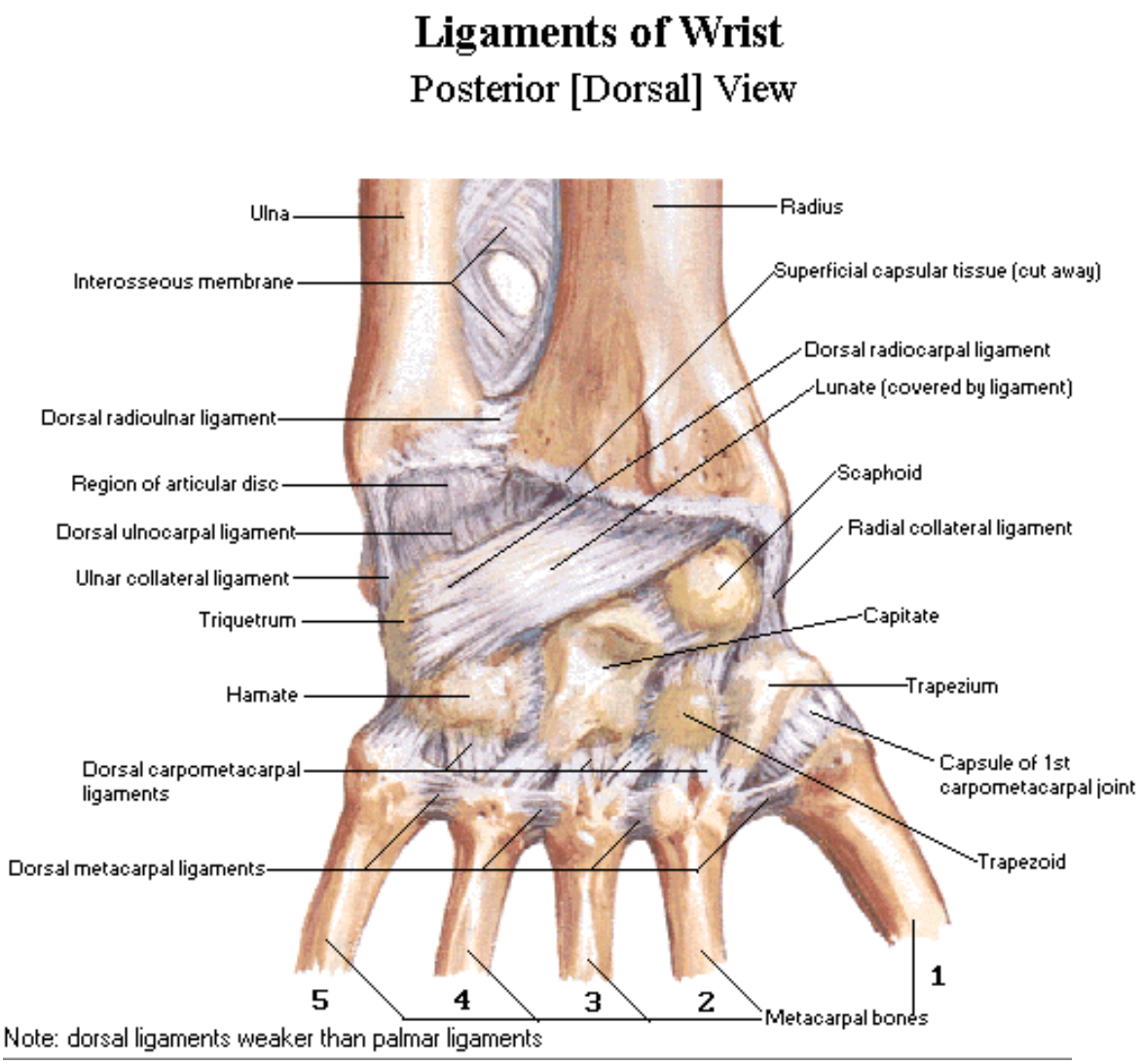
Ulnar collateral ligament :

This is attached to ulnar styloid and divides into two slips; one slip is attached to medial side of the triquetrum and the other to the pisiform.

Radial collateral ligament :

Extends from the tip of styloid crosses of radius to the radial side of scaphoid and trapezium.

Picture : 1


Ligaments of Wrist
Posterior [Dorsal] View
Ulna
Radius
Interosseous membrane
Superficial capsular tissue (cut away)
Dorsal radiocarpal ligament
Lunate (covered by ligament)
Dorsal radioulnar ligament
Region of articular disc
Scaphoid
Dorsal ulnocarpal ligament
Radial collateral ligament
Ulnar collateral ligament
Triquetrum
Capitate
Hamate
Trapezium
Dorsal carpometacarpal ligaments
Capsule of 1st carpometacarpal joint
Dorsal metacarpal ligaments
Trapezoid
1
5
4
3
2
Metacarpal bones
Note: dorsal ligaments weaker than palmar ligaments

Functional anatomy

The distal end of radius is considered the anatomic foundations of wrist joint. The main movements of wrist joint take place in transverse and antero – posterior axis. Wrist flexion and extension occur at radiocarpal and intracarpal joints. Normal range is 75% each. Adduction and Abduction occur at radiocarpal joints. Normal range 20^0 and 30^0 respectively. Supination and pronation take place at the distal radioulnar joint. Supination is greater than pronation. The range of movements is $80^0 – 85^0$ respectively.

Radiological anatomy

It forms the foundation of injury and outcome of treatment.

Standard X-ray views are Anteroposterior, lateral and oblique. Antero posterior view shows the concave inferior articular surface of lower end of radius extending down to tip of styloid process.

Lateral view [8]

For extra-articular fracture, assess dorsal / palmar tilt, extent of Metaphyseal comminution, carpal alignment, displacement of volar cortex and position of Distal radial ulnar joint (DRUJ). For intra-articular fractures assess depression of palmar lunate facet, depression of central fragment and gap between palmar and dorsal fragments.

Oblique view[8] :

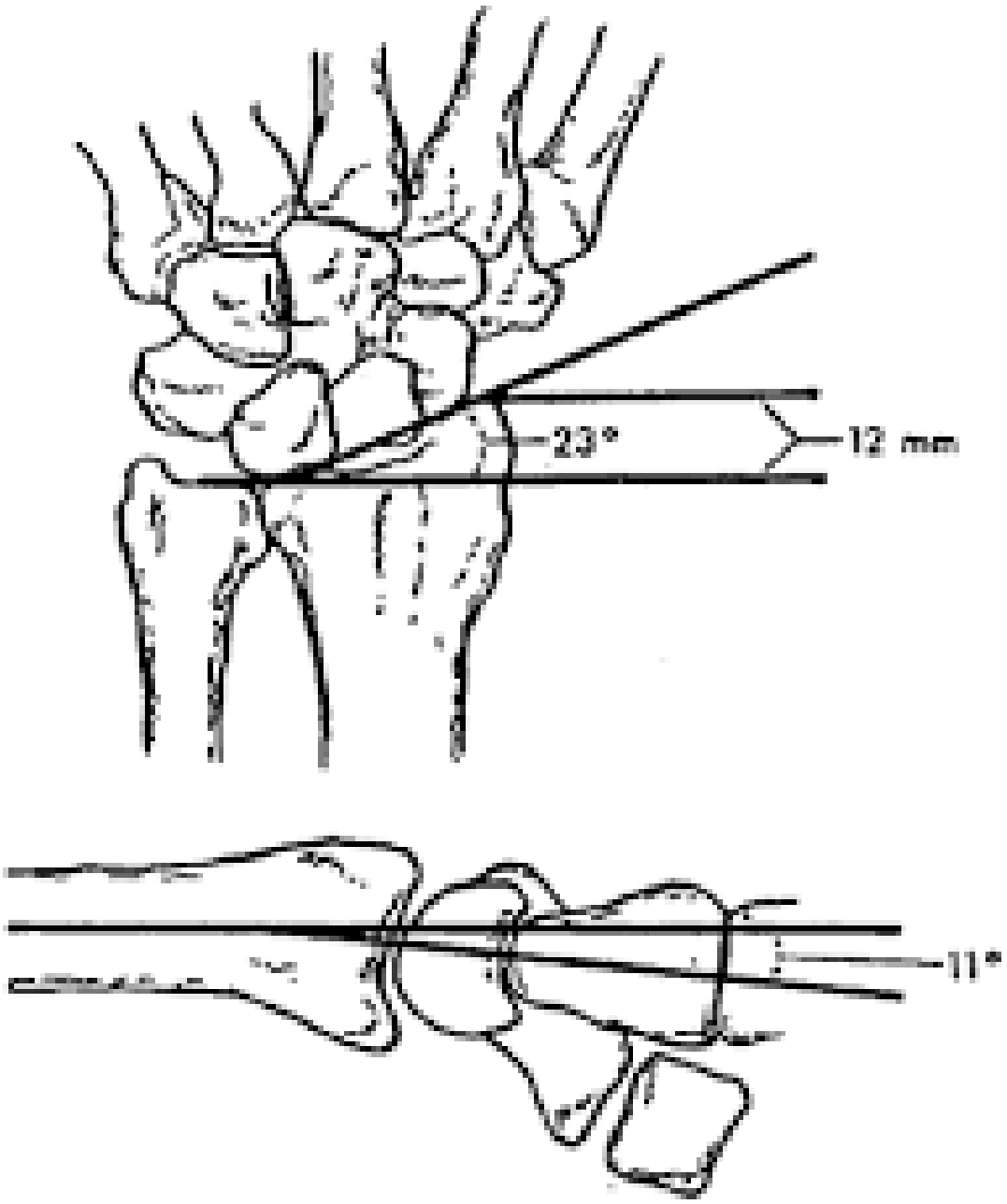
For extra-articular fractures, assess radial comminution. For intra-articular fractures assess radial styloid for split or depression and depression of dorsal lunate facet.

Dorsal / Palmar tilt[8] :

On a true lateral view, a line is drawn connecting most distal points of volar and dorsal lips of radius. The dorsal or palmar tilt is the angle created with a line drawn along longitudinal axis of radius. The average inclination is 21^{o} (range $13^{0} – 30^{0}$).

Picture : 2

Radiological Anatomy :



Volar Tilt / inclination :[08]

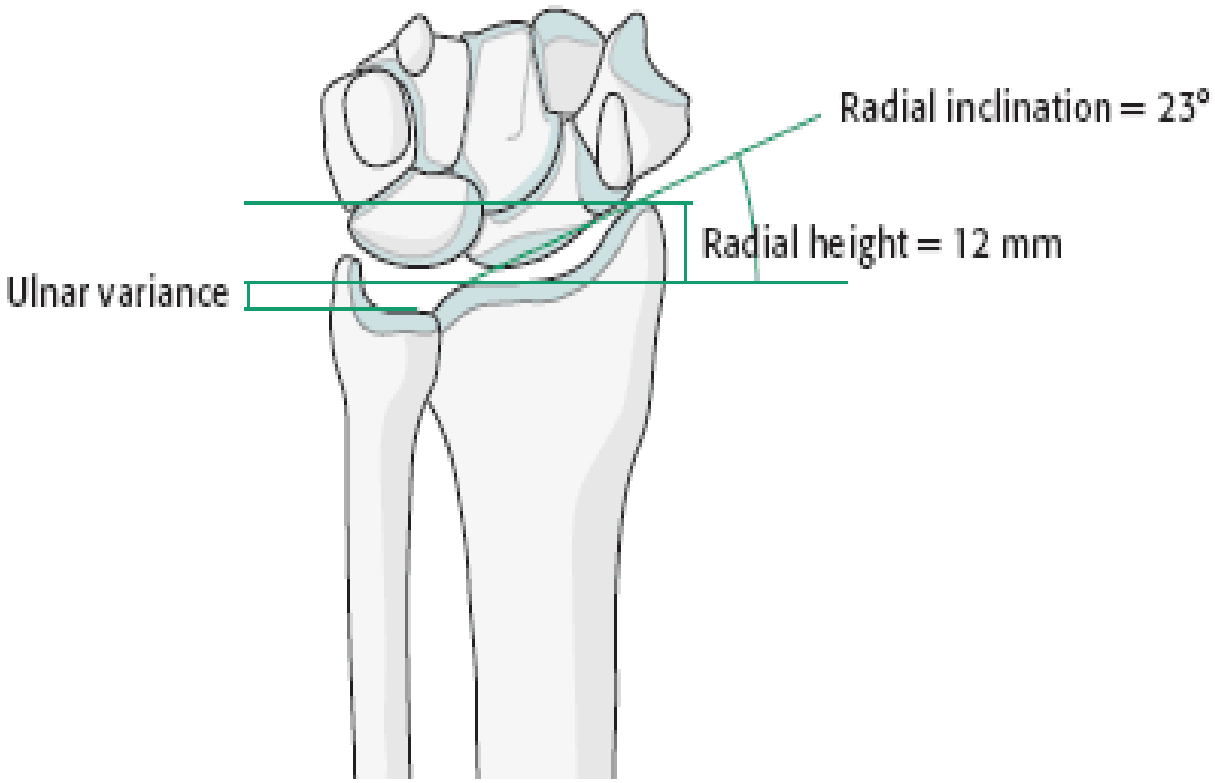
In sagittal view, a line is drawn connecting the distal most point of dorsal and volar rims. The angle that this line creates with a line perpendicular to the longitudinal axis of radius reflects the palmar inclination. Average inclination is 11^0 (range from 4^0-22^0).

Radial Length [8] :

Measured on Anteroposterior view. It is distance in millimeters between a line drawn perpendicular to long axis of radius and tangential to most distal point of ulnar head and line drawn perpendicular to long axis of radius and at tip of radial styloid. Normal range between (11 – 12 mm)

Picture : 3

Radial inclination, **Radial height**, **Ulnar variance:**



Ulnar Variance :

This is a measure of radial shortening. It is a vertical distance between line parallel to medical corner of articular surface of radius and a line parallel to most distal point of articular surface of ulnar head, which are perpendicular to long axis of radius.

s

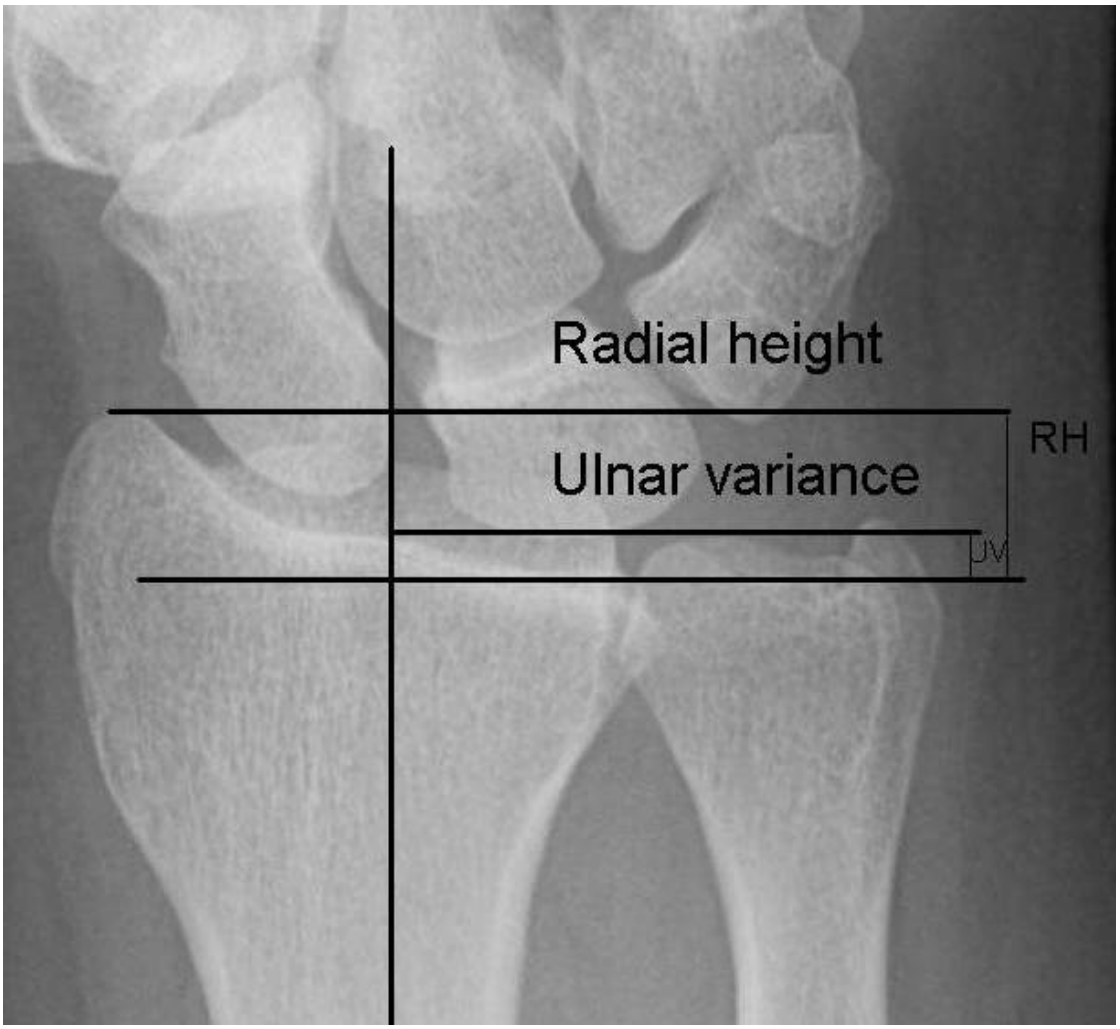


Image : 1Ulnar Variance

FRACTURES OF DISTAL END OF RADIUS

The Avulsion theory : Suggested by Linhart (1852) and analyzed by Lecomate (1861) says that ulna is probably alone (because of intimate contact with humerus) absorbing impact of all on hand, the force being transmitted to radius via interosseus membrane and strong volar ligaments. Then the fracture is produced by avulsion due to traction in strong volar radio carpal ligaments.

The Bending fracture theory :

The theory was put forward by Meyer (1925) and supported by Lewis (1950) says that course of fracture is determined by three factors position of hand, surface of impact and magnitude of force. The kinetic energy causes the forward movement of body to continue, the wrist becomes hyperextended and patient falls over the hand. This loads the volar ligaments and radius is pressed against carpal articular surface, the force being stopped by scaphoid and lunate bones, it is then transmitted to radius, which fractures at its weakest point in same manner as a beam that is loaded beyond the limits of elasticity, Lewis so considered this fracture as a" bending fracture."

Considerable force required to produce fracture – mean of 190 kg for women and 282kg for men.

When a person falls on an out stretched hand, the radius through rigidly bonded carpus bears the force transmitted through the thenar eminence. A great

strain is thrown upon palmar carpal ligaments and the line of force derives carpus upon radius. The radius first fractures on volar surface in tension. Then the fracture propogates dorsally where the bending movement forces induce compression stresses resulting in dorsal cortex comminution or the fracture line producing 45° shear stress lines. The cancellous bone is compacted further reducing dorsal stability. Charnley has shown that the dorsal comminution is a cause of late collapse of radius during the period of immobilization.

The colles fracture occurs while the triangular fibrocartilagenous disc of inferior radio ulnar joint is still intact. Therefore, distal fragment rotates on this hinge with center of rotation at ulnar styloid in direction of supination. If the force is excessive and continues to act, the strain thrown upon the disc may bring about the fracture of the ulnar styloid.

Hyperextension is common major force causing fractures. Intraarticular fractures are prevalent among active persons whose wrists are exposed to violent multi component force comprising of compression, shearing, tension and direct crush. The prominent among these forces is axial compression where proximal carpus acting like a die punch impact disrupts distal radial articular facets. So, the resultant articular fracture comprises of four components – Metaphyseal or shaft, radial styloid, dorsal medial fragment is referred to die punch fragment as coined by Scheck[12].

FRACTURE ANATOMY

In colles fracture six displacements of distal fragment are Impaction, Lateral displacement, lateral rotation, dorsal displacement, dorsal rotation and supination. Distal fragment is compressed with shaft of radius and rotates dorsally. Dorsal Angulation and radial shortening results in “Dinner fork deformity”

Melone identified most intra-articular fractures have four fracture components, they are Radial shaft, Radial styloid, Dorsal medial and palmar medial.

Two medial fragments along with ligamentous attachment to carpus and ulnar styloid is termed as medial complex. Even minimal displacement of Medial fragment is likely to cause major disruption of radial and radioulnar joint with compromise of articular fixation[11].

De Palma demonstrated that even with most severely comminuted fractures, ligaments of wrist remain intact. This is important to maintain reduction by ligamentotaxis.

CLASSIFICATION

There are many classifications, proposed for Distal radius fracture, but more accepted and recent ones are the following.

Gartland and Werley :

Proposed a classification that assessed three basic components of these injuries.

Metaphyseal comminution, intra-articular extension and displacement of fragments.

Group I : Simple colles fracture with no involvement of radial articular surfaces.

Group II : Comminuted colles fractures with intra- articular extension without displacement.

Group III : Comminuted colles fractures with intra-articular extension with displacement.

Group IV : Extra-articular, undisplaced

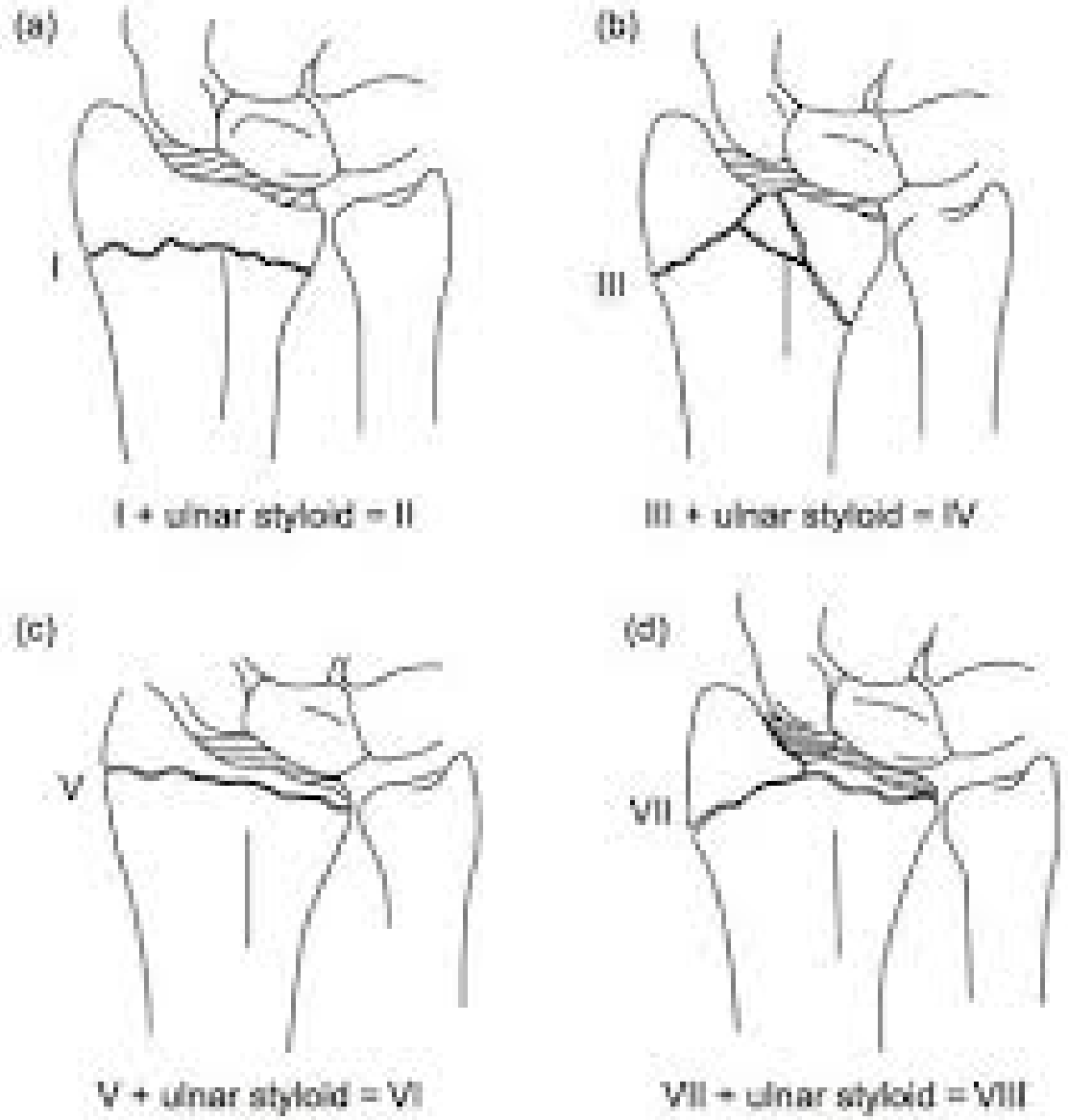
Frykman classification :

It incorporated individual involvement of radioocarpal and radioulnar joints. It is used in this study.

Type I	:	Extra- articular fracture
Type II	:	Extra- articular fracture with ulnar styloid fractures
Type III	:	Radiocarpal articular involvement
Type IV	:	Radiocarpal involvement with ulnar styloid fracture.
Type V	:	Radioulnar involvement
Type VI	:	Radioulnar involvement with ulnar styloid fracture
Type VII	:	Radioulnar and Radiocarpal involvement
Type VIII	:	Radiocarpal and Radioulnar involvement with ulnar styloid fracture.

Picture : 4

Frykmanclassification :



Melone'sClassification :

He emphasized the effect of impaction of lunate on radial articular surfaces to create four characteristic fragments.

Type I : Stable fracture without displacement. This pattern has characteristic fragments of radial styloid and a palmar and dorsal lunar facet.

Type II : Unstable 'die punch' with displacement of characteristic fragments and comminution of anterior and posterior cortices.

Type II A : Reducible

Type II B : Irreducible central impaction fracture.

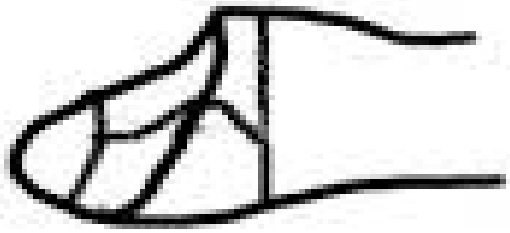
Type III : "Spike" fracture unstable Displacement of articular surface and also of proximal spike of radius.

Type IV : "Spilt" fracture. Unstable Medial complex that is severely comminuted with separation and or rotation of palmar and distal fragments.

Type V : Explosion injury.

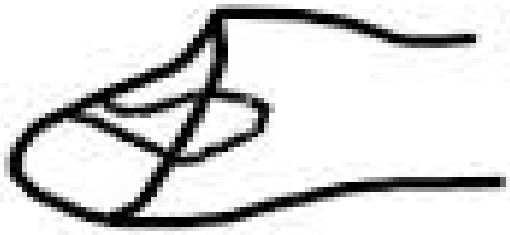
Picture : 5

Melone's Classification:

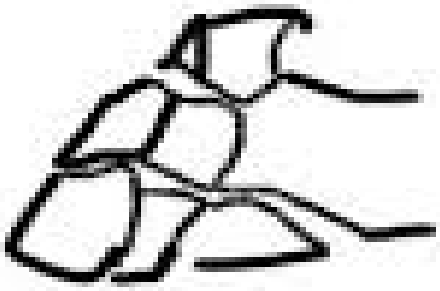


Melone 1

Melone 4 'Split'



Melone 2 'Die Punch'



Melone 5 'Exploded'

Melone 2 'Spike'

OTA / Aoclassification :

It emphasizes increasing severity of bone injury.

Type A : Extra-articular fracture subgroups are based on direction of displacement and comminution.

Type B : partial articular fracture. Sub groups are based on lateral (radial styloid) palmar (or) dorsal fragments.

Type C : Complete articular subgroups are based on degree of comminution of articular surface and metaphysis.

Fernandez Classification :

In 1993, Fernandez proposed a mechanism based classification that would address potential for ligamentous injury and assist in treatment recommendations.

Type I : Metaphyseal bending fractures with inherent problem of loss of palmar tilt and radial shortening relative to ulnar (DRUJ Injuries)

Type II : Shearing fracture requiring reduction and of articular segment.

Type III : Compression of articular surface without characteristic fragmentation, also potential for significant interosseous ligament injury.

Type IV : Avulsion fracture or radiocarpal fracture dislocation.

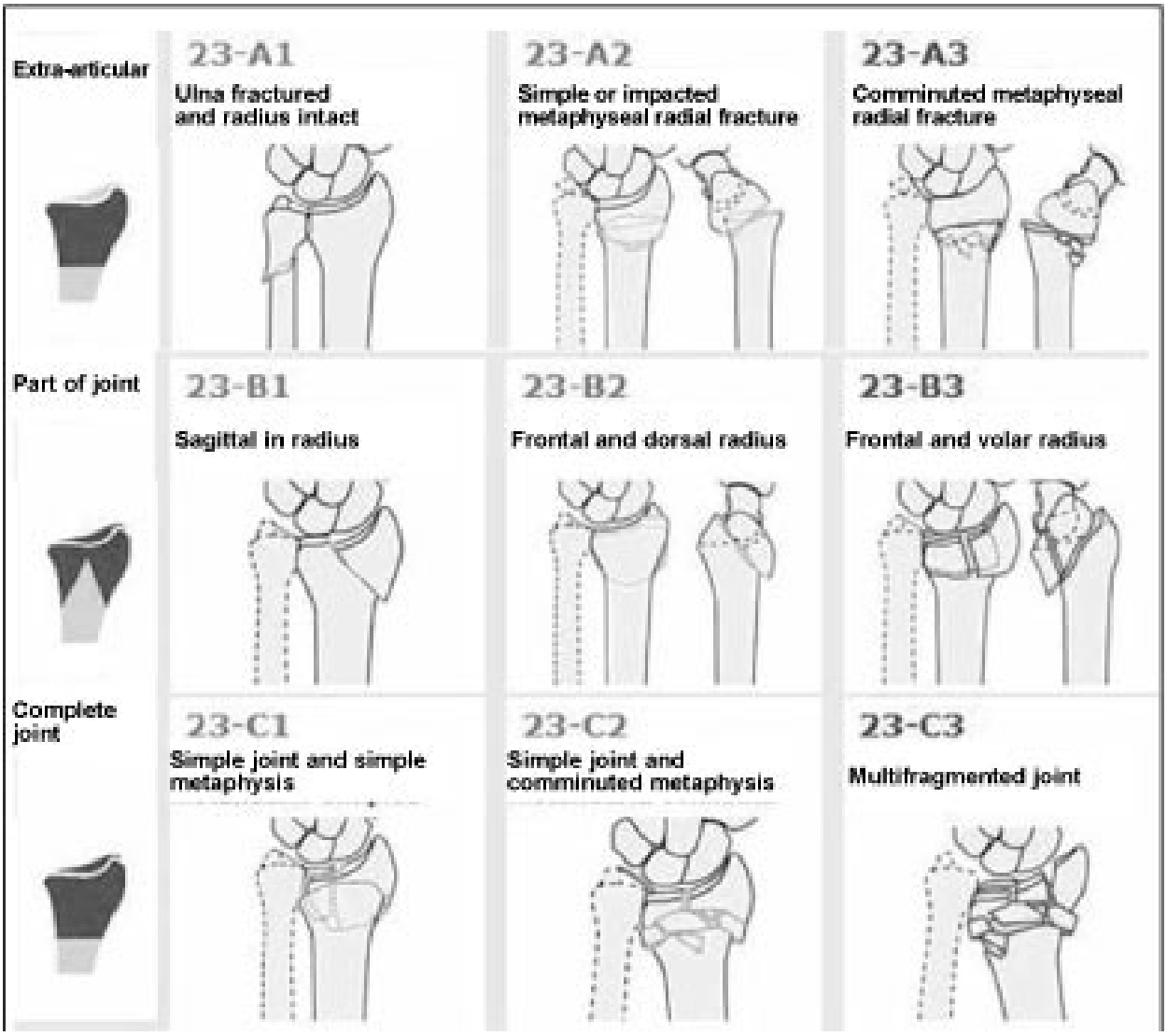
Type V : Combined injuries with significant soft tissue involvement because of high energy nature of these fracture.

Cooney (1990) Universal classification:

Type I	:	Extra-articular Undisplaced
Type II	:	Extra-articular displaced
Type III	:	Intra-articular undisplaced
Type IV	:	Intra-articular displaced

Picture : 6

AO Classification:



MATERIALS AND METHODS

This study is a prospective study, non randomized, study period includes January 2014 to September 2015.

68 Patients were included in the study. 34 patients underwent internal fixation and 34 patients underwent external fixation.

All patients were treated by below elbow plaster slab after other life threatening injuries were ruled out.

Definitive treatment was based on decision of the surgeon on a non – randomized basis.

Treatment was either external fixation with Schanz pins and screws or internal fixation with K wire, Buttress plate, locking compression plate.

Assessment :

Done by non blinder assessment

Subjective assessment – pain, numbness, weakness of hand, stiffness.

Objective – Range of motion (flexion, extension, Radial deviation, ulnar deviation, supination and pronation.)

Range of movements measured by hand held goniometer.

Functional outcome of patient was assessed using DASH (Disability of the Arm, shoulder and hand) Method.

Inclusion Criteria :

- Patients giving valid consent
- Comminuted fracture of distal end of radius of either side or both sides
- Age between 20 – 70 years
- Both Male and female
- Closed / open fractures
- Patients fit for surgery

Exclusion Criteria :

- Refusal by patient
- Compound fracture
- Patient not fit for surgery

SURGICAL TECHNIQUE (EXTERNAL FIXATION)

Anaesthesia :

Regional (Axillary block) or general anaesthesia is used.

.Patient placed in supine position with the affected limb abducted and placed on a side table.

Procedure :

External fixator was applied in the operation theatre under sterile conditions. The pins used for radius were 3.5 mm Schanz type and for that of metacarpal were 2.5 mm schanz type. After painting and draping with or without pneumatic tourniquet a small incision was made on dorsolateral aspect of forearm about 3-5 cm proximal to fracture site. Lateral cutaneous nerve of forearm was identified, 2.7 mm drill bit was used for predrilling. 3.5 mm Schanz pin (half pin) was inserted. Second pin site was selected beyond mid forearm proximally, asgreater the distance from first pin in distal end of radius 3-5 cm proximal to fracture site, more stable is the fixation.

Two Schanz pins were passed to the 2^{nd} metacarpal as follows. First Schanz pin 2.5mm was passed into base of second metacarpal to third metacarpal base. The second schanz pin of 2.5 mm was passed into neck of second metacarpal. Both these pins were passed on lateral surfaces. The radial and metacarpal pins were connected by two external rods. Reduction was

achieved under image intensifier, control and a rod to rod clamp or a third external rod was used when necessary to control angular element of deformity. Best position is ulnar deviation of forearm.

Postoperatively, upper limb was elevated for 24 hours with monitoring of neurovascular status. Early motion of digits, elbow and shoulder was encouraged.

Patient was discharged and called for follow up every two weeks till 6 weeks, then every 3 months till one year.

During the follow up period, patients were advised about the exercises of the elbow, digits, and shoulder and about the cleaning of the pin site with saline and soap water. Early pin tract infection was treated with antibiotics. Fixator removal was done after clinical and radiological evidence of fracture healing.

After fixator removal, a removable splint or POP slab was given for another 3-6 weeks, that was to be removed during exercises. Range of motion exercises for fingers, wrist and elbow were advised.

Image : 2 Pin Insertion

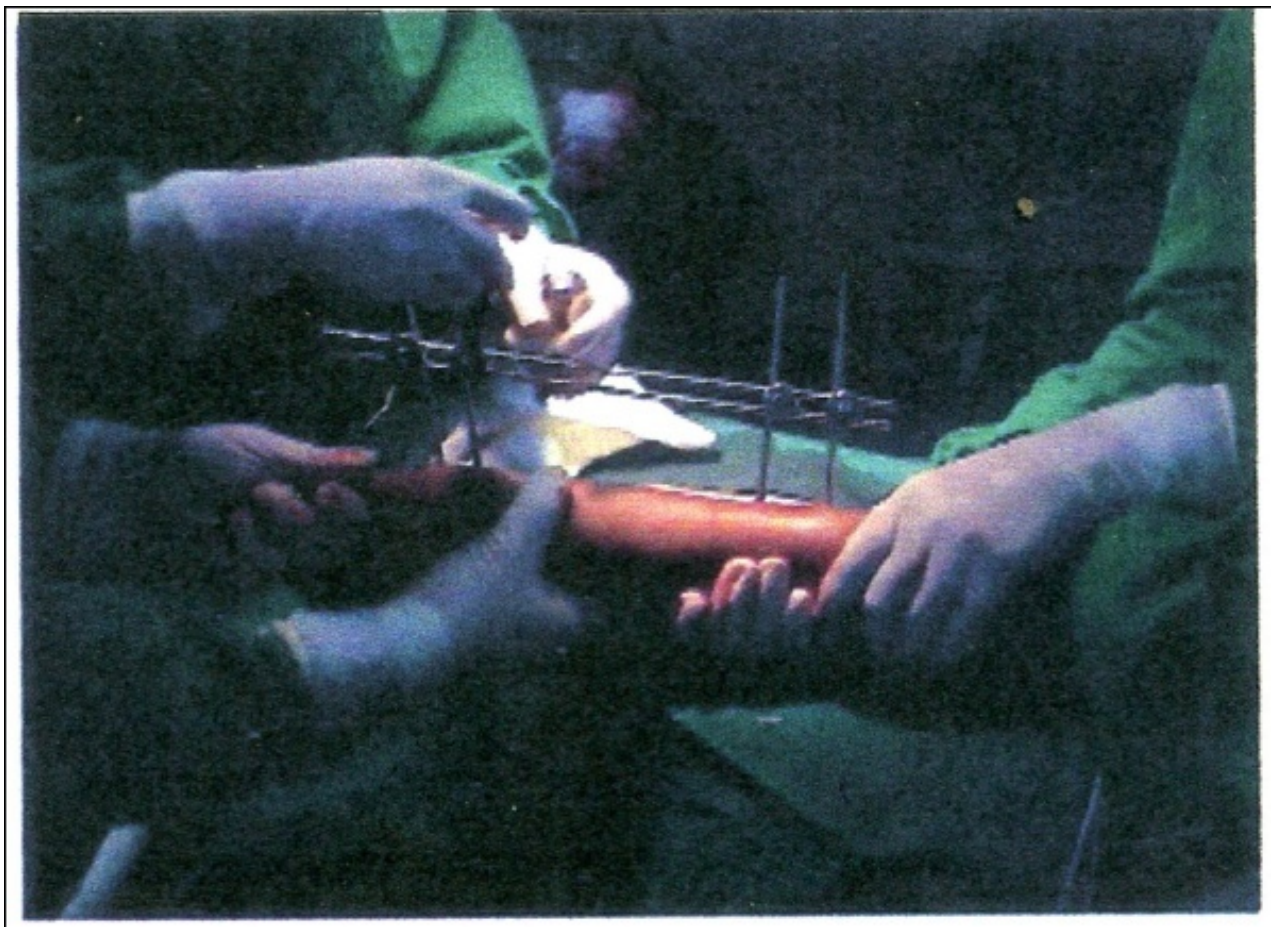


Image : 3 Fracture Reduction

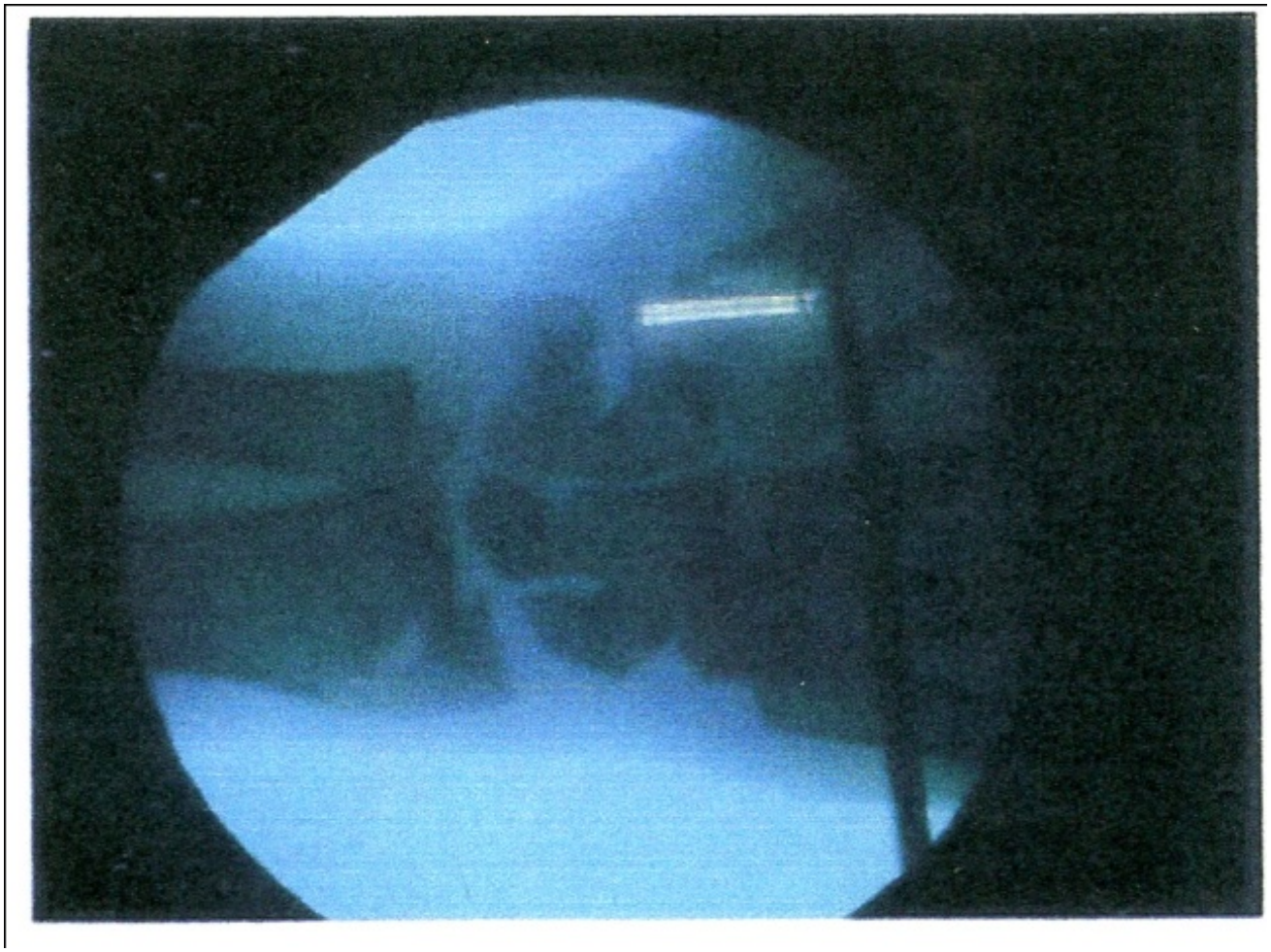


Image : 4 Image intensifier

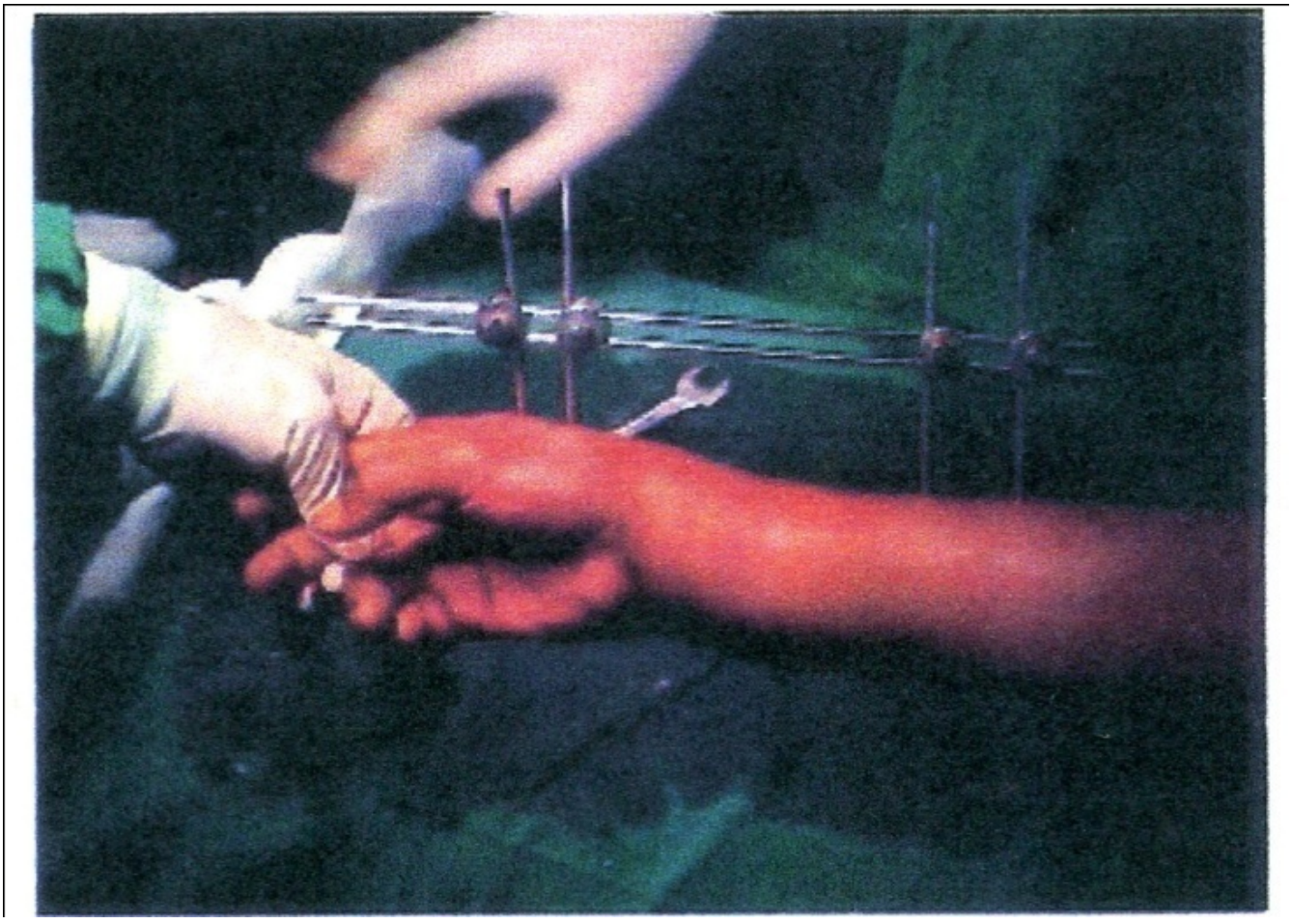


Image : 5 Tightening of Fixator

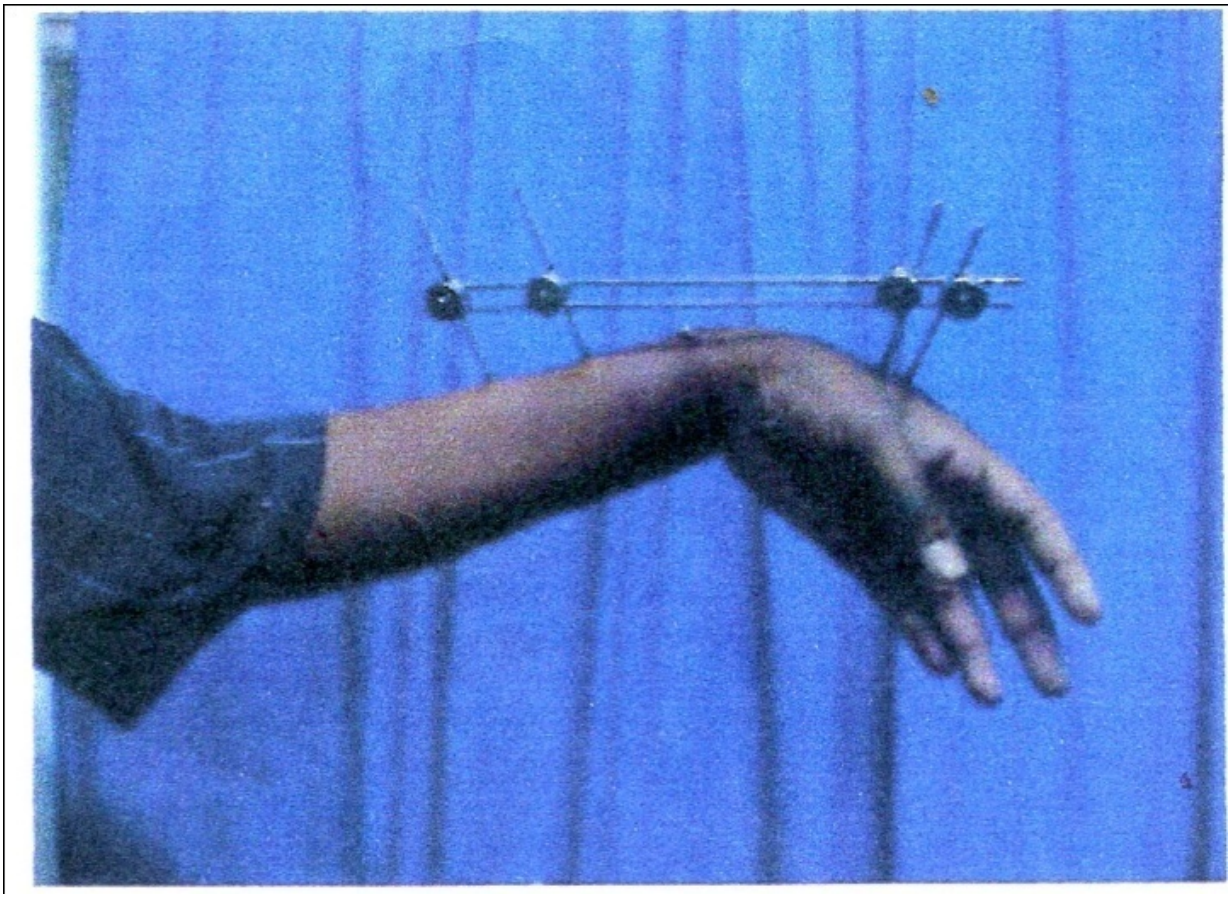


Image : 6 Clinical Picture of External Fixator in Situ

SURGICAL TECHNIQUE (INTERNAL FIXATION)

Anesthesia :

Regional (Axillary block) or general anesthesia used.

Buttress Plating

Procedure :

After painting and draping, a longitudinal incision about 7.5 cm long on the radiovolar aspect of the distal forearm was made. The plane between the flexorcarpiradialis and the Palmaris longus was developed. The flexor pollicis longus tendon was retracted towards radial side and the median nerve and other tendons were retracted towards ulnar side. The fibres of pronator quadratus were severed from their origin on the radius and the fracture was exposed.

Fracture was reduced and a buttress plate was contoured so that, when it is applied and fixed to the proximal fragment, the distal transverse part will act as a buttress and hold the fractures reduced. A minimum of two screws were inserted in the proximal fragment.

Screws were inserted through the distal part of plate into the Fracture fragments. The reduction of the Fracture and restoration of the articular surface

were confirmed by direct observation and by anteroposterior and lateral views in c arm. Pronator quadratus was replaced over the plate to its origin on the radius and wound was closed.

Post operatively, upper limb was elevated for 24 hours with monitoring of neurovascular status. Early motion of digits, elbow and shoulder was encouraged.

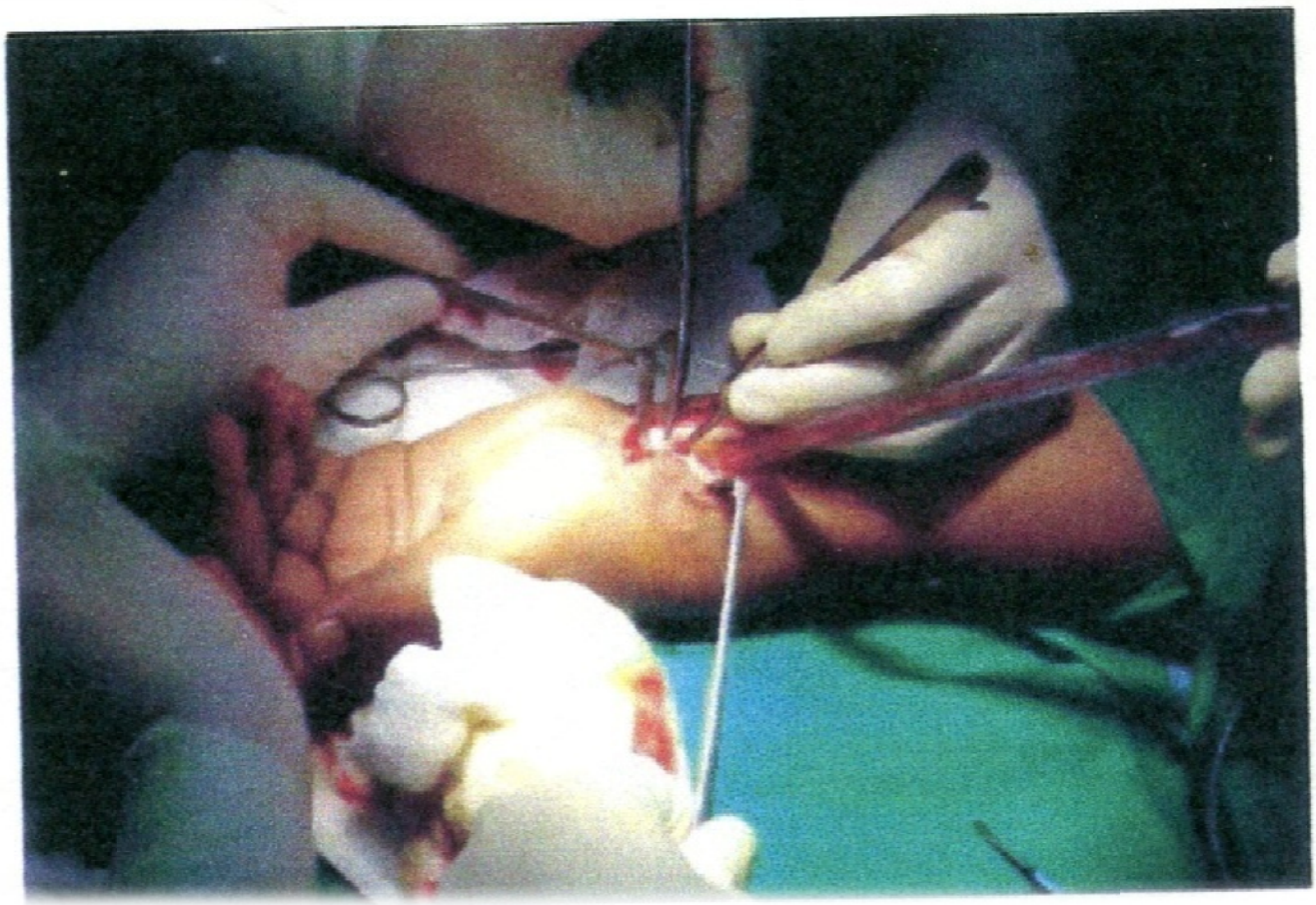


Image : 7 INCISION

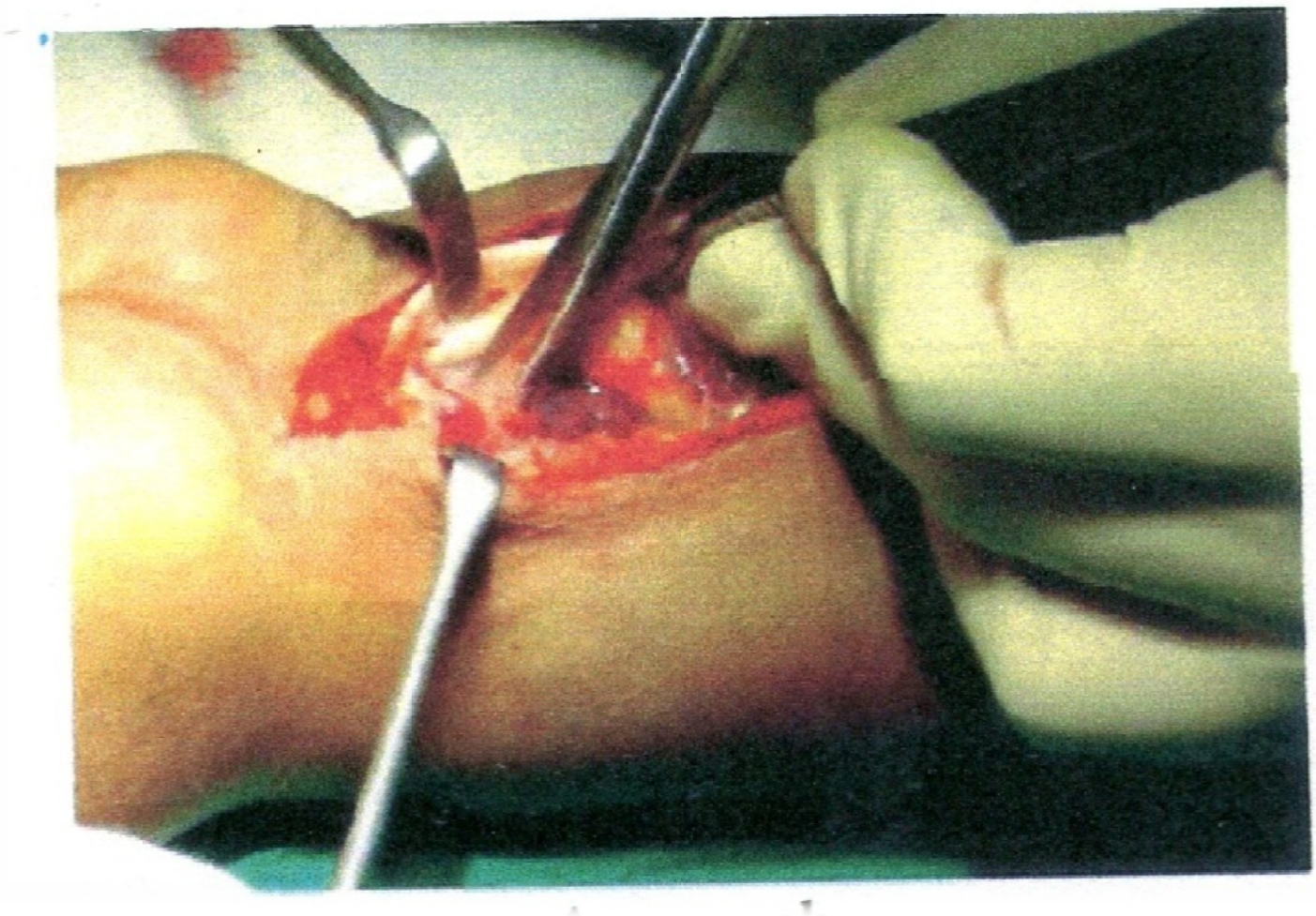


Image : 8 APPROACH

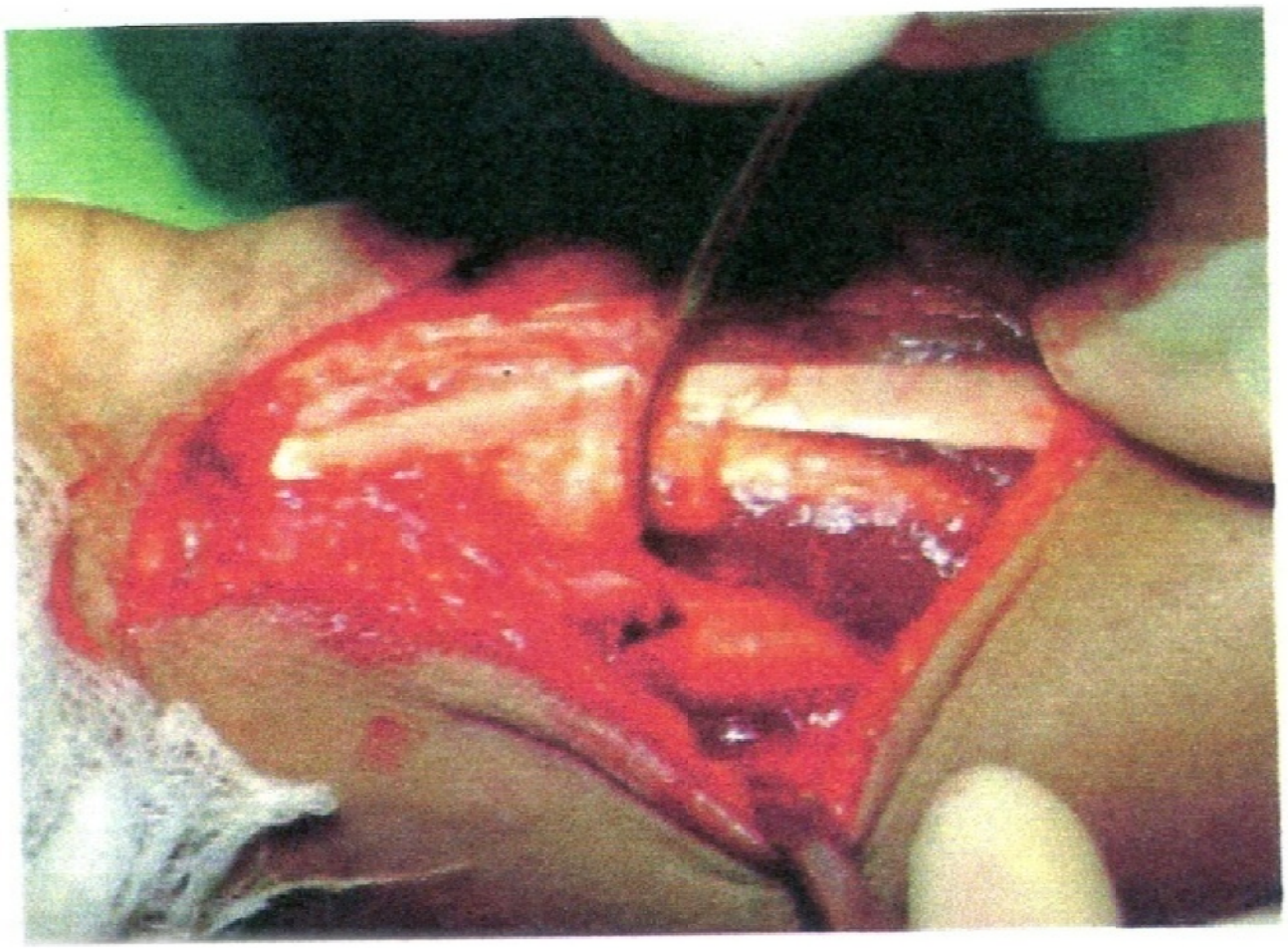


Image : 9 EXPOSURE OF FRACTURE SITE

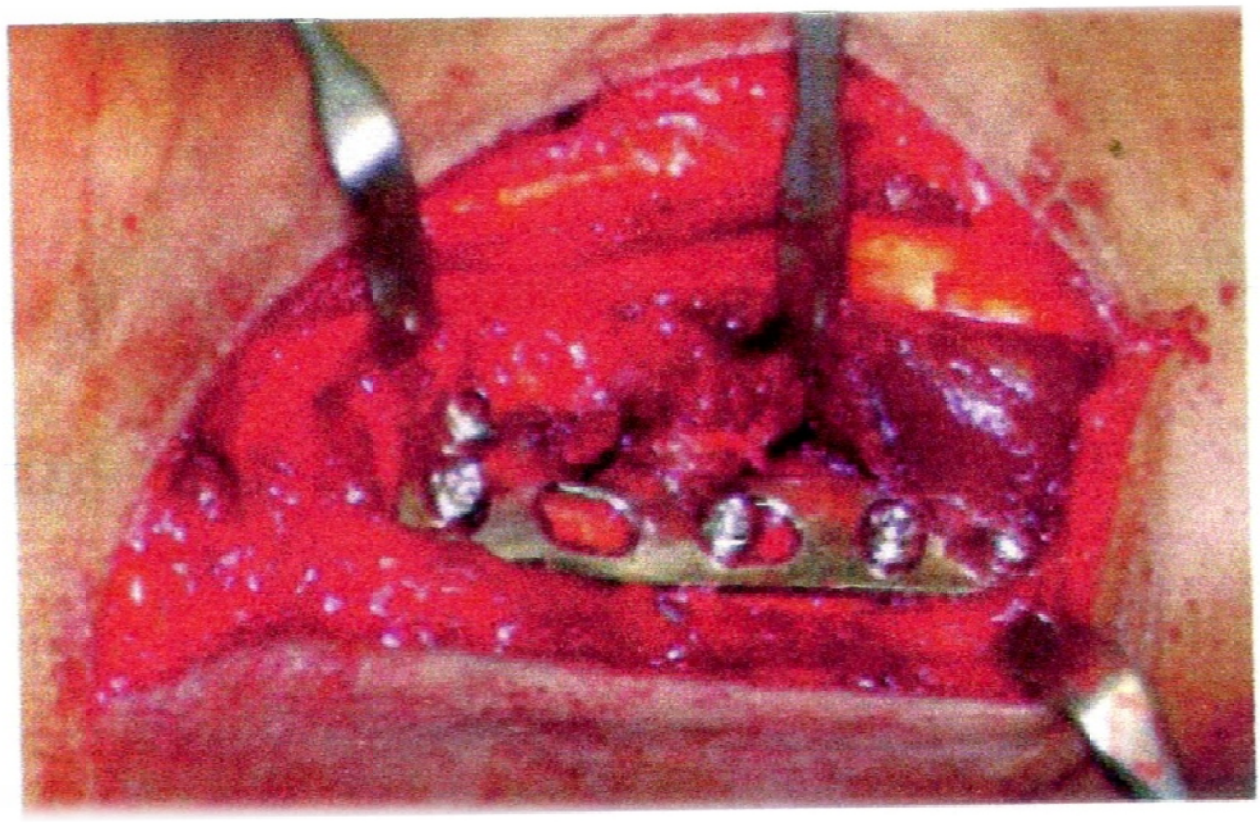


Image : 10 AFTER ORIF WITH PLATE OSTEOSYNTHESIS

FOLLOW UP

Patients were assessed which included objective impression of the patient, objective grading of function and deformity, a comparison of final and initial X-ray.

Subjective factors such as pain, functional limitations, occupational consideration were taken into account.

Follow up intervals are 6 weeks, 3 months and 1 year. Objective examination included inspection of the wrist for deformity, tenderness, abnormal mobility of the distal radioulnar joint, measurement of range of movements extending from shoulder to digits, grip strength, light touch and pin prick sensitivity.

Complication of external fixation :

Superficial pin tract infection

Pin Breakage and loosening

Second metacarpal fracture

Reflex sympathetic dystrophy

Median nerve neuropraxia

Transient sensory impairment of radial nerve

Tendon and soft tissue tethering

Late radial collapse.

Complications of Internal Fixation :

Early :

Inadequate Anaestheisa

Difficult reduction (or) reduction maintained only in extreme position

Depressed major Articular fragment

Distal radioulnar subluxation or dislocation

Median, ulnar, radial nerve stress, contusion or compression

Post reduction swelling – compartment syndrome

Tendon laceration especially Extensor pollicis longus

Pain dysfunction syndrome

Associated carpal bone injury.

Late :

Loss of reduction and secondary deformity

Radial shortening and angulation

Inadequate articular reduction

Distal radioulnar dislocation and arthritis

Shoulder hand syndrome

Carpal Tunnel syndrome

Radio carpal Osteoarthritis

Extensor pollicis longus tendon rupture.

RESULTS

Sixty Eight cases admitted is SMIMS hospital were considered for the study.

STATISTICAL METHODS EMPLOYED

Chi square test was employed in the study.

Chi square test :

Chi Square test tabulates a variable into categories and computes a chi-square statistic. The test compares observed and expected frequencies in each category to test either all categories contain same proportion of values or each category contains user specified proportion of values.

The following observations were made from data collected during study and data was tabulated as follows.

Table : 1

Sex Distribution :

Sex	No. of cases	%
Male	56	82.35%
Female	12	17.65%
Total	68	100%

Out of 68 cases, 56 were male and 12 were female.

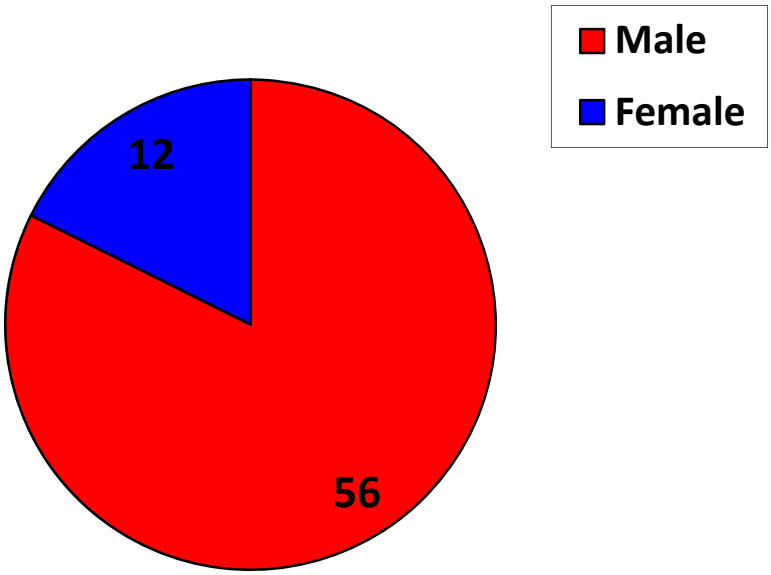


Figure : 1 **Sex Distribution**

Table : 2 Sex Distribution:

Results	Male			Female		
	IF	**EF**	**Total**	**IF**	**EF**	**Total**
Excellent	2	1	3	0	0	0
Good	21	24	45	7	0	7
Fair	2	5	7	2	3	5
Poor	0	1	1	0	0	0
Total	**56**			**12**		

Results were corrected using chi square method. The Chi square value was found to be 6.25 and p value 0.1021 which shows that sex of patient did not influence outcome of treatment.

Table : 3

Sex Distribution:

	IF	**EF**	**Total**
Male	25	31	56
Female	9	3	12
Total	34	34	68

Table : 4

Age Distribution :

Age	No. of Cases	%
18 – 20	06	8.82%
20 – 30	16	23.53%
30-40	18	26.47%
40-50	08	11.76%
50 – 60	16	23.53%
60 – 70	4	5.88%
Total	**68**	**100%**

The Youngest of the series was 18 years old and the oldest was 68 years old.

Figure : 2 Age Distribution :

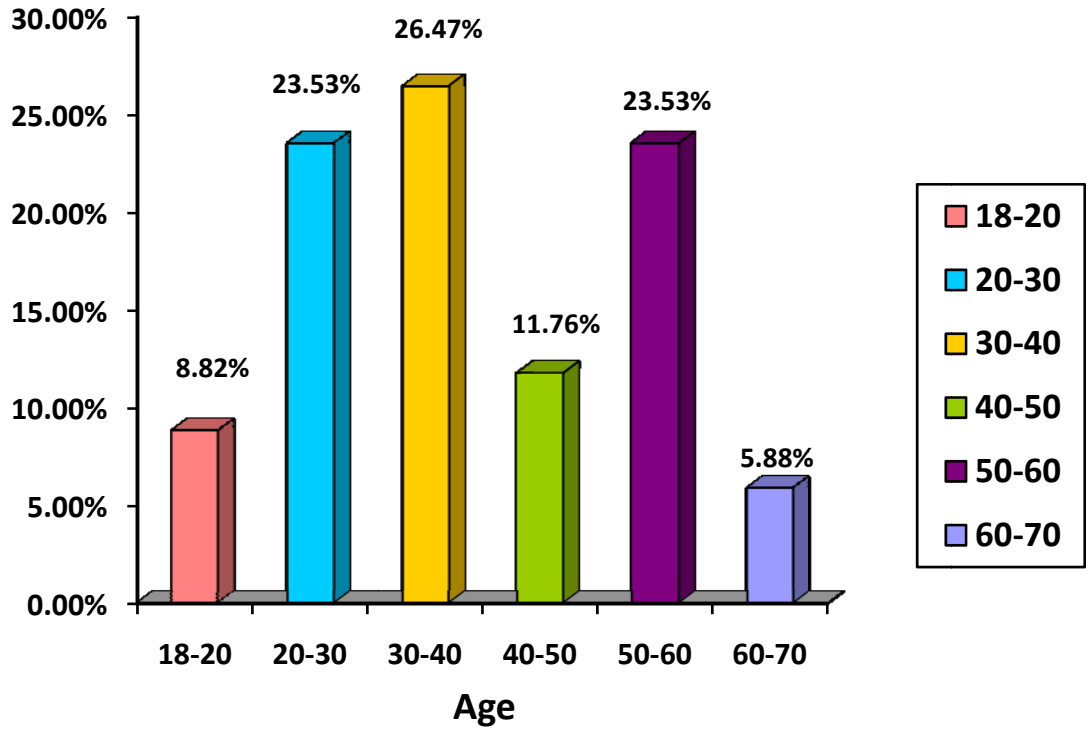


Table : 5 Age Distribution :

Results	**18 – 20**			**20 – 30**			**30 – 40**		
	IF	**EF**	**Total**	**IF**	**EF**	**Total**	**IF**	**EF**	**Total**
Excellent	0	0	0	1	1	2	1	0	1
Good	4	1	5	6	5	11	8	7	15
Fair	0	0	0	0	3	3	1	1	2
Poor	0	1	1	0	0	0	0	0	0
Total	**6**			**16**			**18**		

Table : 6 Age Distribution :

Results	40 – 50			50 – 60			60 – 70		
	IF	**EF**	**Total**	**IF**	**EF**	**Total**	**IF**	**EF**	**Total**
Excellent	0	0	0	0	0	0	0	0	0
Good	3	2	5	5	7	12	2	2	4
Fair	1	2	3	2	2	4	0	0	0
Poor	0	0	0	0	0	0	0	0	0
Total	**8**			**16**			**4**		

This chi square value was found to be 19.52 and p value 0.19117 which shows that age of patient did not influence outcome of the treatment.

Table : 7 Age Distribution :

Age	IF	EF	Total
18 – 20	4	2	6
20 – 30	7	9	16
30-40	10	8	18
40-50	4	4	8
50 – 60	7	9	16
60 – 70	2	2	4
Total	**34**	**34**	**68**

Table : 8 Side Involved :

Side	No of Cases	%
Right	32	47.06%
Left	36	52.94%
Total	68	100%

Majority of the fractures were of the left side.

Figure : 3

Side Involved :

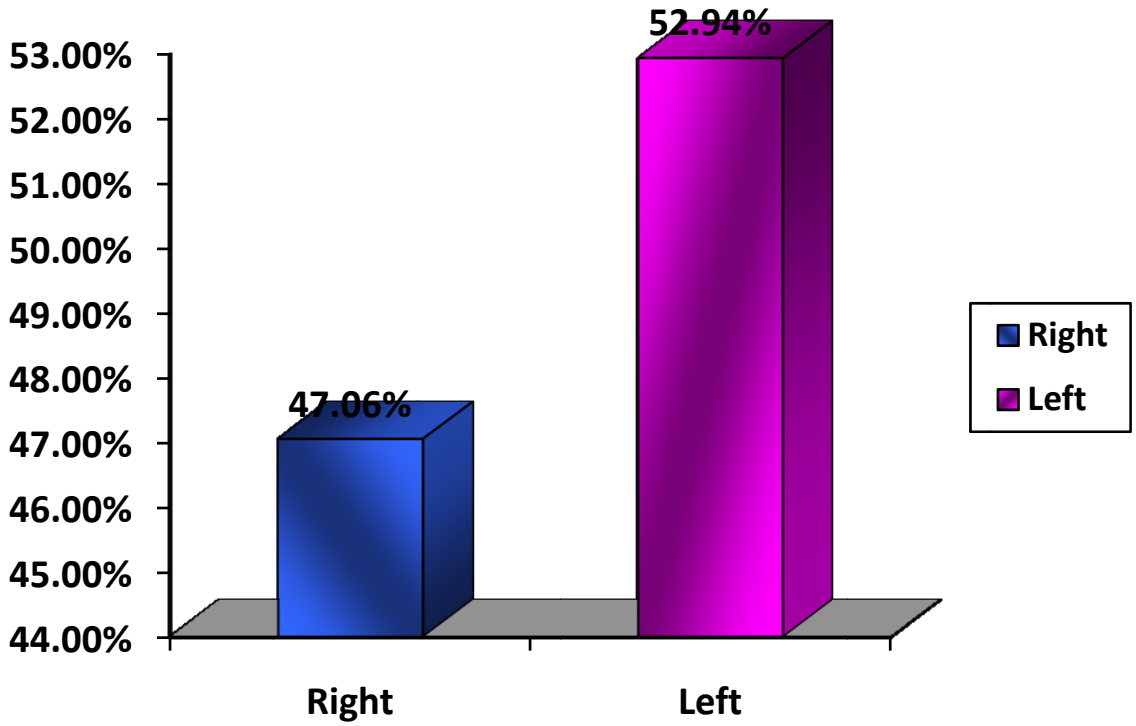


Table : 9

Side Involved :

Result	Right			Left		
	IF	**EF**	**Total**	**IF**	**EF**	**Total**
Excellent	0	1	1	2	0	2
Good	11	14	25	17	10	27
Fair	3	3	6	1	5	6
Poor	0	0	0	0	1	1
Total	32			36		

The chi square value was found to be 1.179 and p value 0.7580 which shows that side involved did not influence the outcome of treatment.

Table : 10

Side Involved :

	IF	EF	Total
Right	14	18	32
Left	20	16	36
Total	34	34	68

Table : 11

Mode of Injury :

Mode	No of Cases	%
RTA	39	51.35%
Fall	29	42.65%
Total	68	100%

In the study prominent cause of injury was high energy trauma due to Road Traffic accident followed by fall on outstretched hand.

Figure : 4

Mode of Injury:

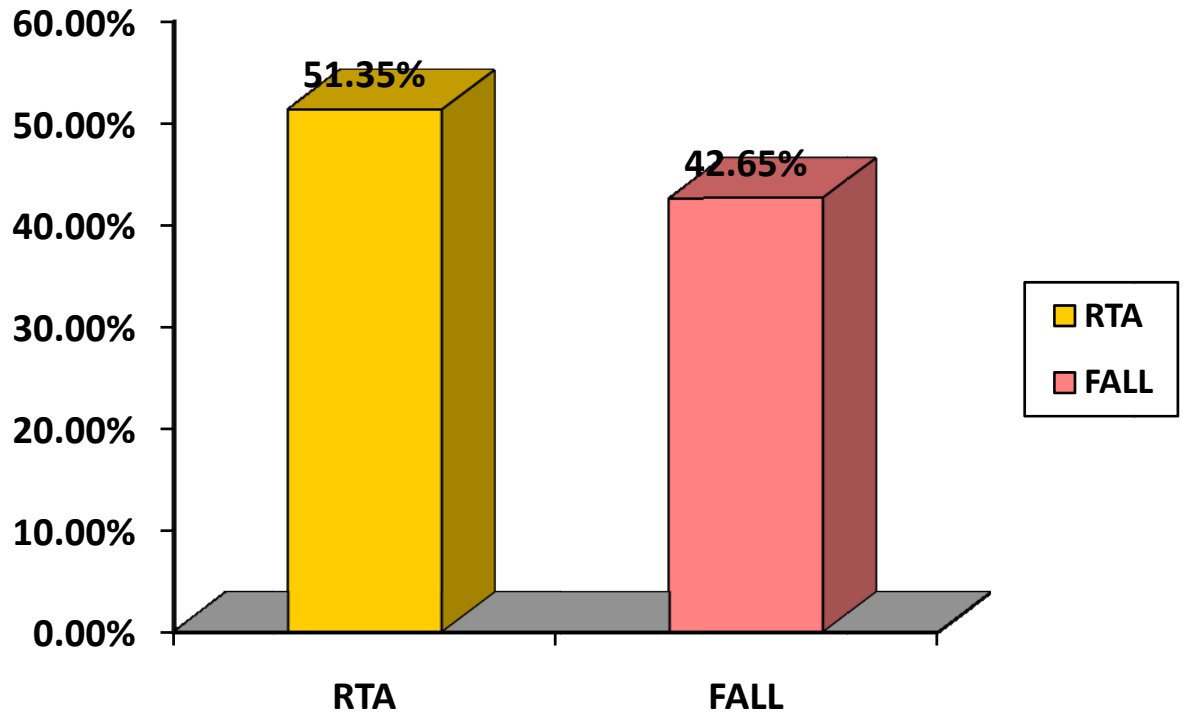


Table : 12

Mode of Injury:

Results	RTA			Fall		
	IF	**EF**	**Total**	**IF**	**EF**	**Total**
Excellent	1	1	2	1	0	1
Good	21	10	31	7	14	21
Fair	3	3	6	1	5	6
Poor	0	0	0	0	1	1
Total	39			29		

The Chi square value was found to be 1.83 and p value 0.6094 which shows that mode of injury did not influence the outcome of treatment.

Table : 13

Mode of Injury:

	IF	**EF**	**Total**
RTA	25	14	39
Fall	9	20	29
Total	34	34	68

Table : 14

TYPE OF FRACTURE :

Type of Fracture	**No of Patients**	**Percentage**
Closed	64	94.12%
Open	4	5.88%
Total	68	100%

Out of 68 fractures, only 4 were GustiloType I open fractures treated by external fixator application.

Table : 15

Type of Fracture :

Results	Closed	Open
Excellent	3	0
Good	51	1
Fair	9	3
Poor	1	0
Total	64	4

The chi – square value was found to be 9.6442. The P value 0.021845. The result is significant at $P < 0.05$.It shows type of fracture is statistically significant in determining outcome of the patient.

Figure : 5

Type of Fracture :

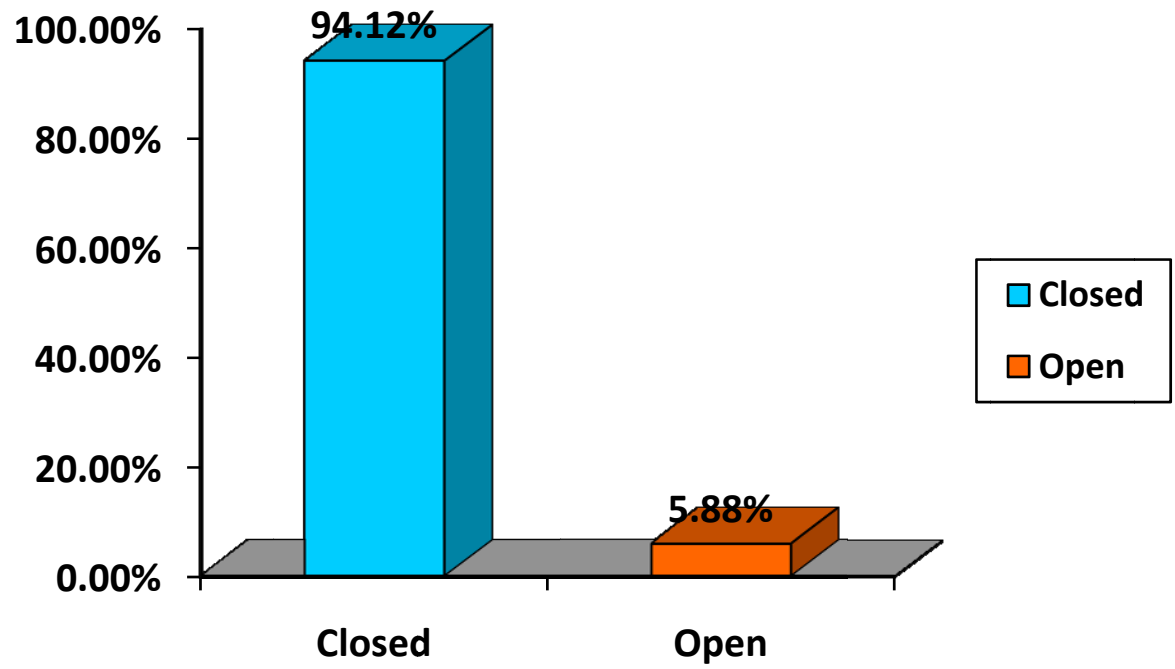


Table : 16

FRYKMAN'S CLASSIFICATION :

Classification	No of Patients	Type of Fixation
Type I	03	Internal fixation
Type II	00	-
Type III	13	Internal Fixation
Type IV	08 02	Internal Fixation External fixation
Type V	07 06	Internal Fixation External fixation
Type VI	03 05	Internal Fixation External fixation
Type VII	11	External Fixation
Type VIII	10	External Fixation

Largest number of cases were of Frykman's Type III (13), though there were cases in other types also. Fracture type was classified according to Frykman's classification and cases were selected randomly. Three cases of Frykman's Type I fractures were treated by Internal fixation because of inability to achieve reduction by closed methods. Period of minimum follow up of patients was I year and patients were assessed clinically.

Table : 17 METHOD OF FIXATION :

Method of Fixation	No of Cases	%
IF	34	50%
EF	34	50%
Total	68	100%

Figure : 6 METHOD OF FIXATION

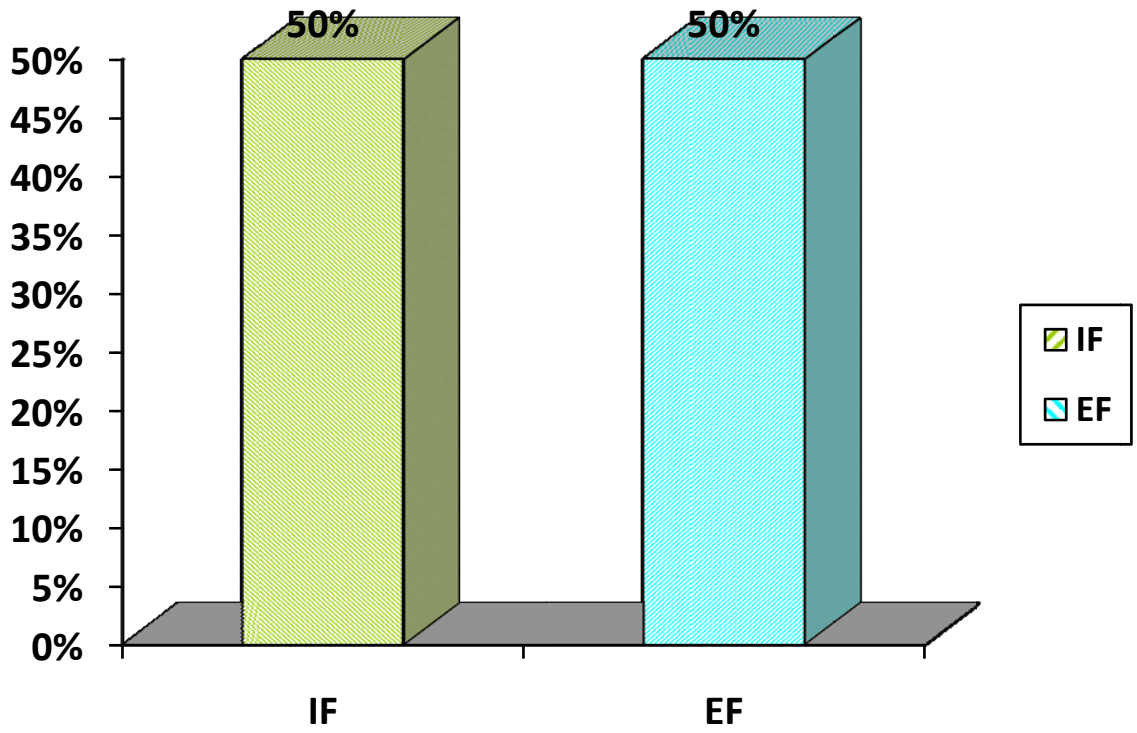


Table : 18.

Method of Fixation :

Results	IF	EF
Excellent	2	1
Good	28	24
Fair	4	8
Poor	0	1
Total	34	34

The chi square value was found to be 2.97 and p value 0.3955 which shows that method of fixation does not determine the outcome of treatment.

Table : 19

Movements after 12 weeks compared with normal side :

Wrist	Normal ROM	Result (Average)
Dorsiflexion	75^0	70^0
Palmar Flexion	75^0	65^0
Ulnar deviation	30^0	25^0
Radial deviation	20^0	15^0
Forearm		
Supination	80^0	70^0
Pronation	75^0	65^0

Average Time of Fracture Union :

The Average time of fracture union was 5.76 months with a standard deviation of 0.50 in case of ORIF with Buttress plate and 3.76 months with standard deviation of 0.74 in case of fracture treatment with external fixator.

Complication :

Table : 20

External Fixation

Complications	No of Patients
Wrist Stiffness	1
Pin site infection	5
Pin Loosening	2
Tendon rupture	0
Compression Neuropathy	0
Sudeck’s osteodystrophy	0
Finger Stiffness	1
Iatrogenic rupture	0

The commonest complications were pin tract infection and pain in wrist joint.

Table : 21

Internal Fixation :

Complications	No of Patients
Wrist Stiffness	3
Nerve Injuries	0
Vascular injuries	0
Tendon rupture	0
Compression Neuropathy	0
Sudeck’s osteodystrophy	0
Finger Stiffness	3
Iatrogenic rupture	0

Table : 22

RESULTS

Results	No of cases	Percentage
Excellent	3	4.41%
Good	52	76.47%
Fair	12	17.65%
Poor	1	1.47%
Total	68	100%

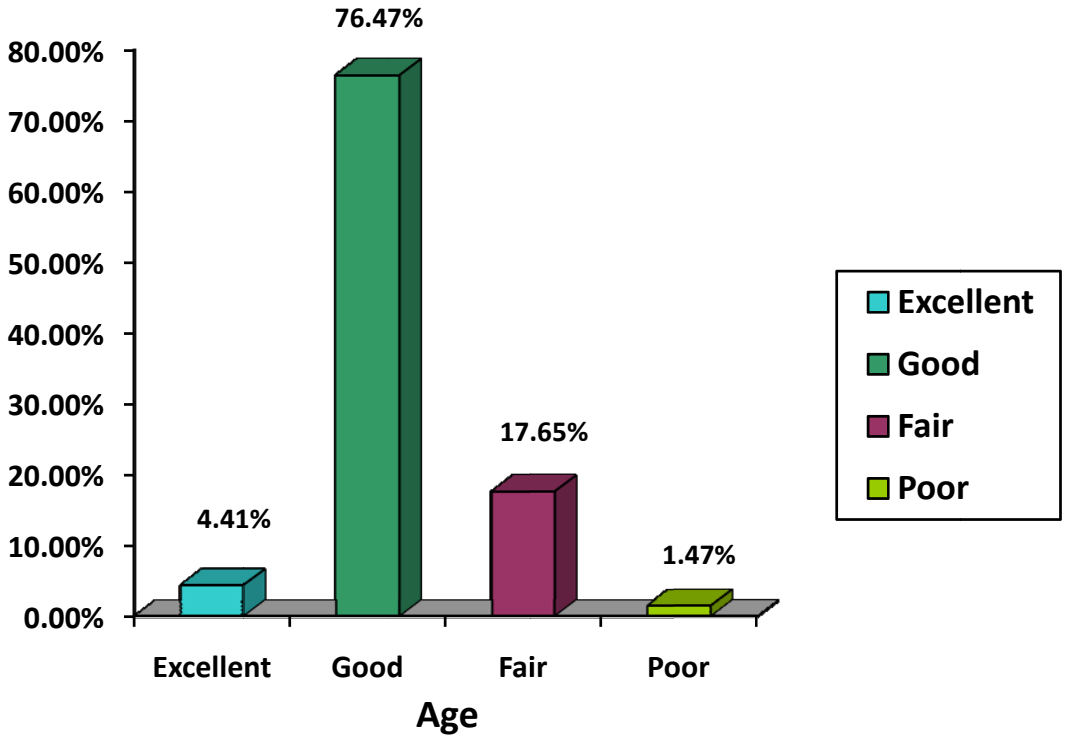


Figure : 7 Functional Results

With help of DASH (Disability of Arm, shoulder and Hand) method, functional results were as follows :

Excellent (3) - 4.41%

Good (52) - 78.18%

Fair(12) - 17.65%

Poor (1) - 1.47%

RESULTS

Table : 23

Internal Fixation :

Results	No of cases	Percentage
Excellent	2	5.88%
Good	28	82.35%
Fair	4	11.76%
Poor	0	0%
Total	**34**	**100%**

Table : 24

Results :

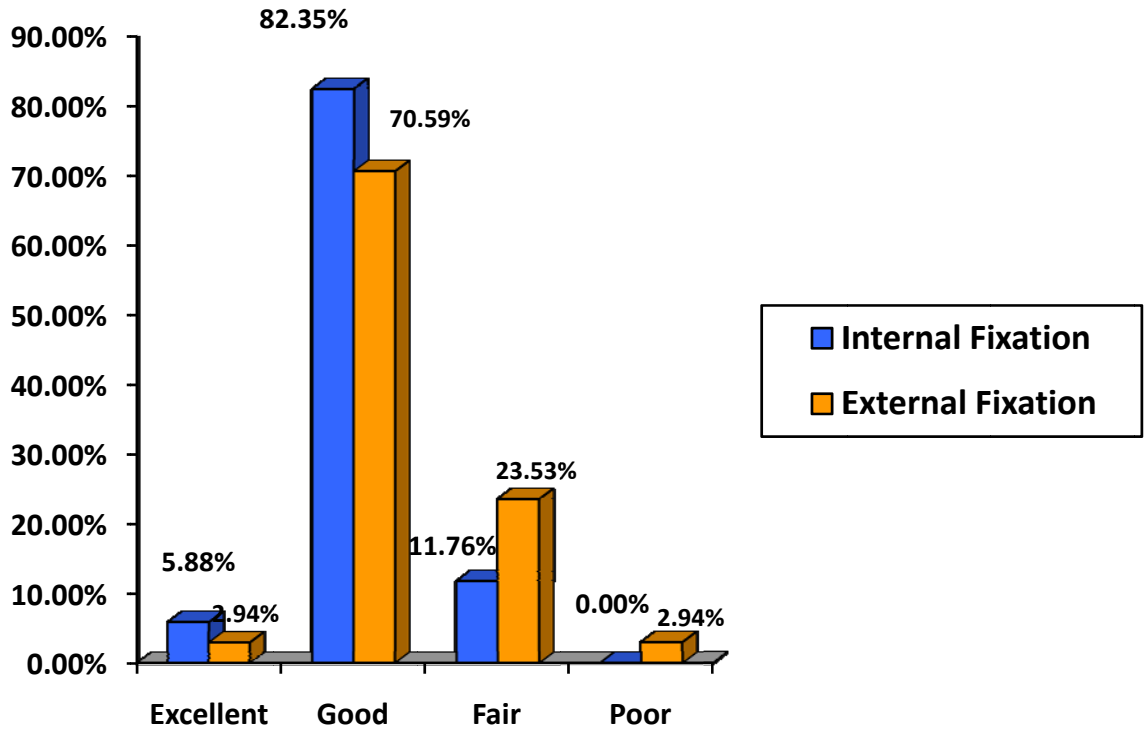
External Fixation :

Results	No of cases	Percentage
Excellent	1	2.94%
Good	24	70.59%
Fair	8	23.53%
Poor	1	2.94%
Total	**34**	**100%**

Figure : 8

Results :

Internal Fixation & External Fixation:



DISCUSSION

Distal Radius fractures are one of the commonest fractures occurring in Adults. Comminuted unstable fractures of these type are often difficult to manage by conservative methods. Surgical techniques such as External fixation and Internal fixation are used in treatment of comminuted unstable fractures of distal radius.

External fixation surgical procedure is done with schanz pins and screws. It allows fracture fragments to fall in place and brings about reduction and maintains the distraction force during healing. It is used when fracture fragments are very small, extremely comminuted and open fractures are best treated by this method. Ligementotaxis is useful in restoring skeletal length and wrist position can be adjusted. Advantages of external fixator are its superior Mechanical efficiency, its capacity of fracture adjustment during the healing period.

Open reduction and Internal fixation surgical procedure uses better and smaller implants, K wire, Buttress plate and Locking compression plate. Even comminuted fractures with dorsal metaphyseal instability can be fixed with a volar plate. It has the advantages like early and better mobilization and function of hand, repair of ruptured tendons, less residual pain, stiffness, restriction and better chance of restoring joint congruity.

The current study is a prospective, non-randomized study to compare the effects of External fixation and Internal fixation in surgical management of unstable comminuted fractures of distal radius. This study evaluates the functional outcome of patients treated with Internal fixation and External fixation using DASH (Disability of Arm, Shoulder and Hand) Method. 68 patients with comminuted unstable fractures of

distal radius were employed in the study. 34 patients who underwent external fixation procedure and 34 patients who underwent Internal fixation were included in the study. The patient selection was based on factors such as Age, Fracture pattern, bone quality, Type of fracture, affordability of patient.

Of the patients employed in the study, 82% were males and 18% were females. In our study, sex of the patient is not statistically significant ($p = 0.1021$) in determining functional outcome of the patient. Previously zhuang cui et al[19] conducted meta-analysis of unstable distal radius fractures treated with Internal fixation versus External fixation. It included pooled data from ten randomized controlled trials included 738 patients, orthopedic journals. It discussed that a prospective study of patient's age more than 35 years with colles fracture at six centers in the united kingdom for a period of one year reported that the overall incidence of this fractures is found to be more in females than in males. Therefore, although there may effect modification due to mean and proportion of women, we could not determine this from available data.

In the current study, patients from age groups 18 years to 68 years old were employed. Patients in age group of 18-20 years were of 8.82%, age group of 20-30 years patients were of 23.53%, in the age group of 30-40 years 26.47% were employed, 11.76% and 23.53% of patients were on the age group of 40-50 and 50-60 years. In the age group of 60-70 years 5.88% patients were included. Majority of patients were in age group of 30-40 years. Fracture incidence found to be more (or) less equal in younger and older age groups representing bimodal distribution distal radius fractures. More patients in the younger age group reflects greater incidence of high velocity injuries, while in elderly even low velocity injuries causes distal radius

fractures. However, age of the patient is statistically insignificant (P = 0.19117) in determining functional outcome of the patient.

In our series left sided fractures were common than right sided fractures. Besides, side of the fracture is not statistically significant (P = 0.7580) in determining the outcome of the patient.

In this study, mode of Injuries, Road Traffic Accident and fall were the causes of distal radius fractures. Road Traffic Accident were of major cause found than fall. However, Jerry Knirket al[10] found on their series, fall from height to be the main cause of fractures. In our study, Mode of Injury is statistically insignificant (P = 0.6094) in determining functional outcome of the patient.

In our study, open fractures and closed fractures were included. Surprisingly, type of fracture was found to be statistically significant (P = 0.021845 and chi square value 9.6442) in determining functional outcome of the patient. Probably, the significance of type of Injury in functional outcome is due to less number of patients included in open fractures type, additionally complications such as infections are most common in open fractures than closed type which delay healing of fractures and ultimately the functional outcome.

Many classifications such as Gartland and werley, Frykman classification, Melone's classification, OTA / Ao classification, Fernandez classification, Cooney universal classification were proposed for distal radius fractures. In our study, Frykman's classification was employed which is one of the most accepted and recent classification. Most fractures in the study were of Frykman type 3. Fractures were also distributed in other groups. There were no type 2 fractures. Similarly, kapooret

al[21] conducted a study in orthopedic department for a period of 5 years, they used frykman classification for assessment of fractures.

In the surgical procedure, External fixation 2.94% patients had Excellent results, 70.59% had good results, 23.53% had fair results and 2.94% had poor results. In the Internal fixation group 5.88% patients had excellent results, 82.35% had good results, 11.76% had fair results and no one had poor results. Our study showed that method of fixation is statistically not significant (P = 0.3955) in determining the functional outcome of the patient, though the study has certain limitations such as non-randomized, non-blinding techniques used and less number of patients were employed. Similarly Margaliotet al[23] did a Meta – analysis of distal radius fractures treated with External fixation and Internal fixation. 46 articles were included in the study after careful serenity of Internal fixation and external fixation 917 patients were included in external fixation group and 603 were included in Internal fixation group. Outcomes were assessed using pooled grip strength, Range of motion, Radiographic assessment and physician related outcomes. The authors conclude that current literature does not recommend the superiority of one method over the other.

The most common complications in our series was pin tract infection in external fixation group and wrist stiffness in Internal fixation group. Besides the above factors discussed to influence the functional outcome of fracture, proper pre operative evaluation, patient selection for each surgical technique, proper post operative care and rehabilitation influence the outcome.

CONCLUSION

The prospective study was conducted to compare the functional outcome of patients with comminuted unstable distal radius fractures treated with External fixation and Internal fixation surgical procedures.

In the current study, in the external fixation group 2.94% patients had excellent results, 10.59% had good results, 23.53% had fair results and 2.94% had poor results. In the Internal fixation group 5.88% patients had excellent results, 82.35% had good results, 11.76% had fair results and no one had poor results.

In the current study, method of fixation is not statistically significant in determining functional outcome of the patient.

Similarly, sex of the patient, Age, mode of Injury were statistically insignificant in determining functional outcome in our study.

In our study, Type of fracture is found to be statistically significant in determining functional outcome of the patient.

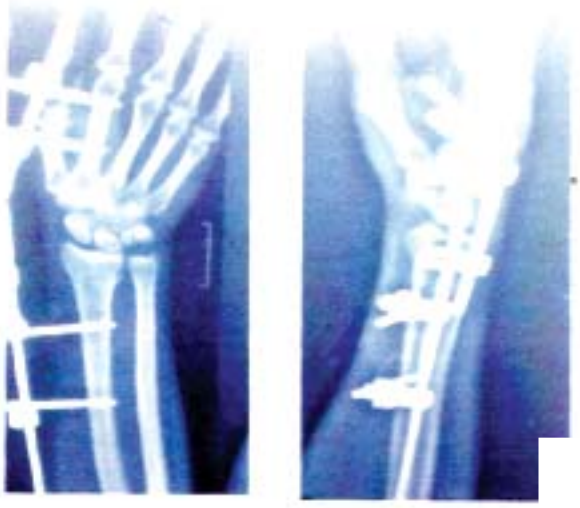
CLINICAL PICTURES

CASE : 1

50 YEARS OLD MALE CAME WITH HISTORY OF SLIP AND FALL ON AN OUTSTRETCHED HAND

Image- 11

Preop



Postop

ONE YEAFOLLOW- UP XRAYS

Image : 12

Image :13

RANGE OF MOTION

DORSI FLEXION

PALMAR FLEXION

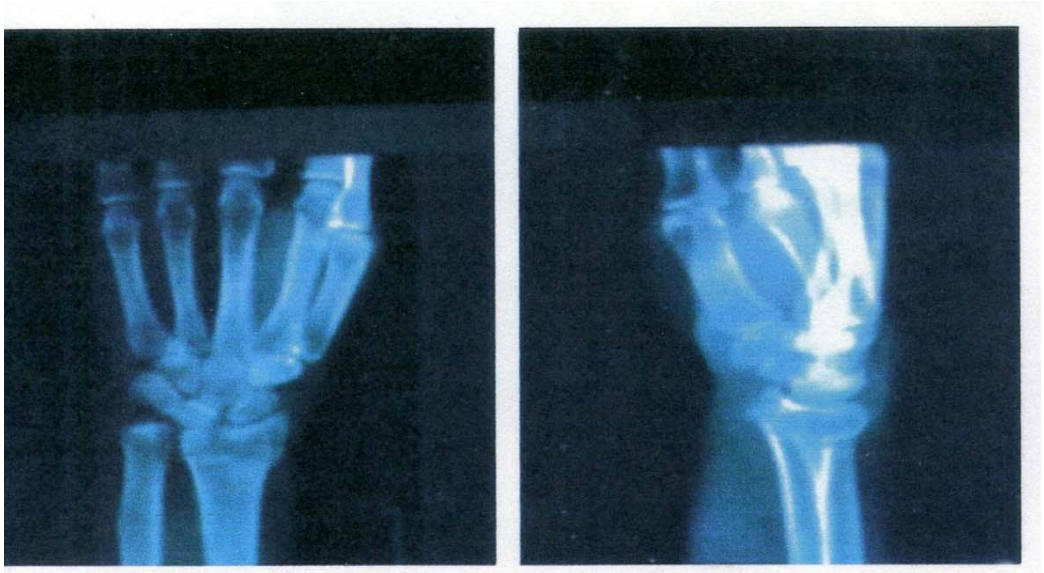
pronation

supination

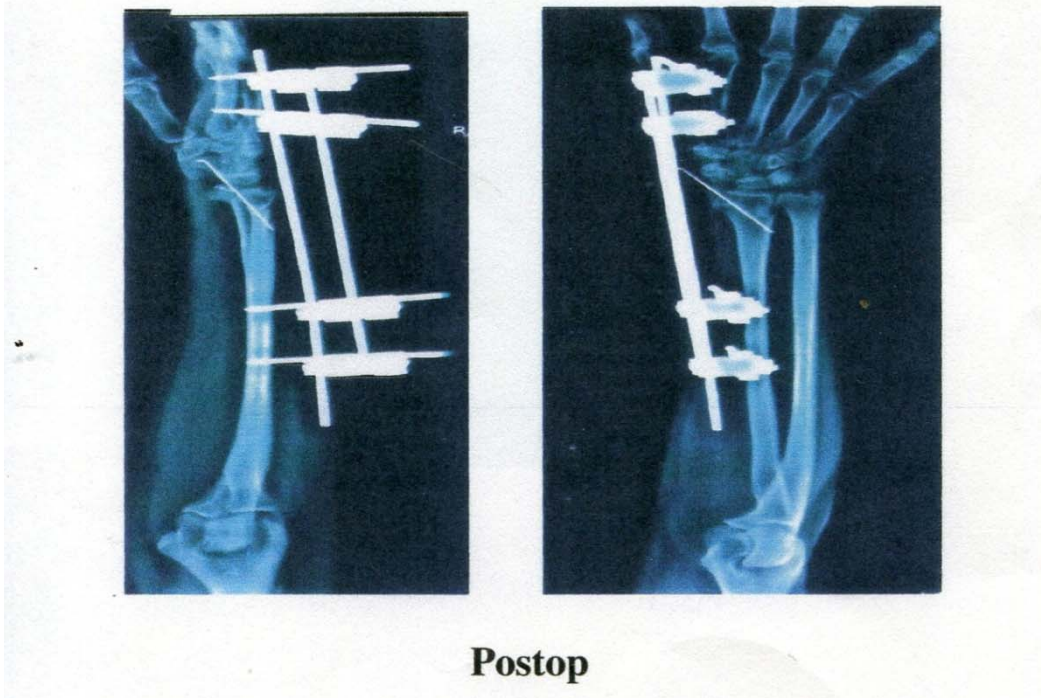
CASE :2

53 YEARS OF FEMALE HAD HISTORY OF SLIP AND FALL ON A OUT STRETCHED HAND

Image : 14



Preop



Postop

POST IMPLANT REMOVAL (6 WEEK)

Image : 15

RANGE OF MOTIONS

Image : 16

Dorsi Flexion

Palmar Flexion

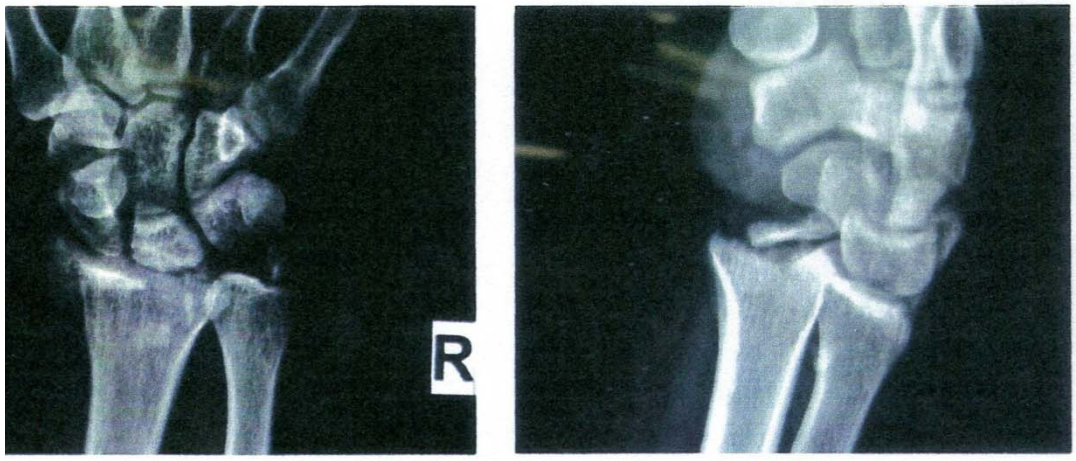
Pronation

Supination

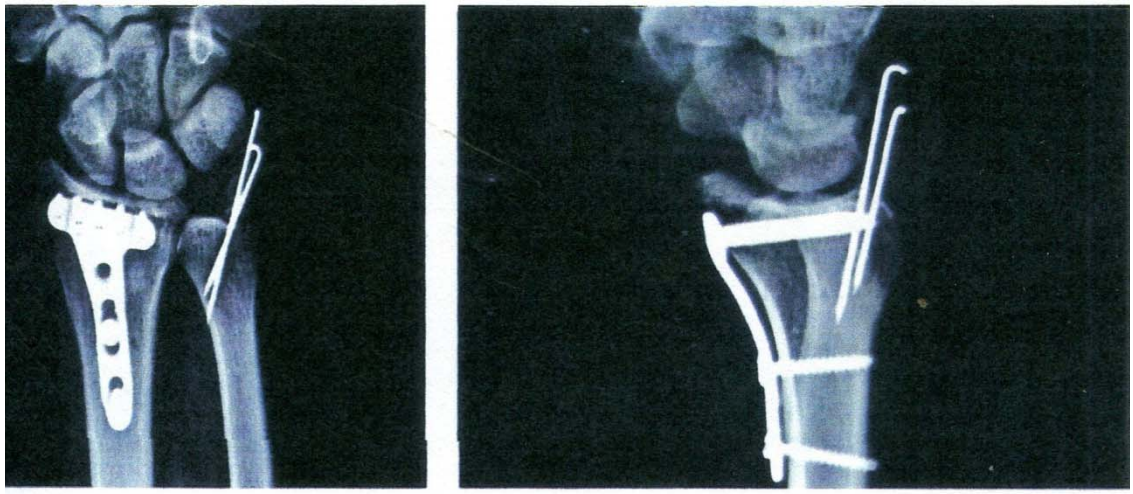
CASE : 3

28 YEARS OLD MALE CAME WITH HISTORY OF RTA

Image : 17



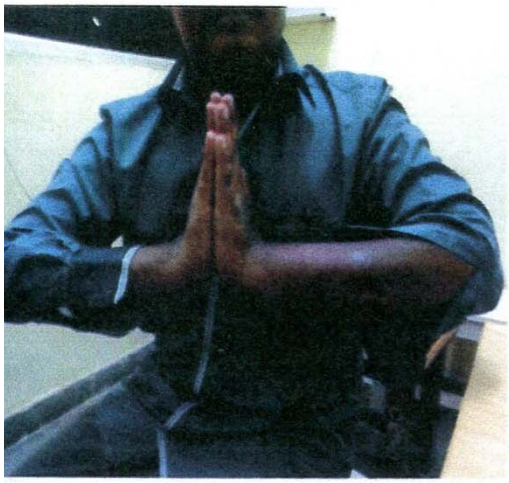
Preop



Postop

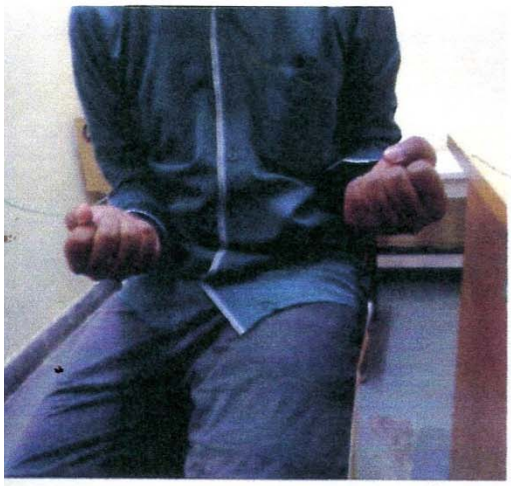
RANGE OF MOTIONS

Image : 18



Dorsi Flexion

Palmar Flexion



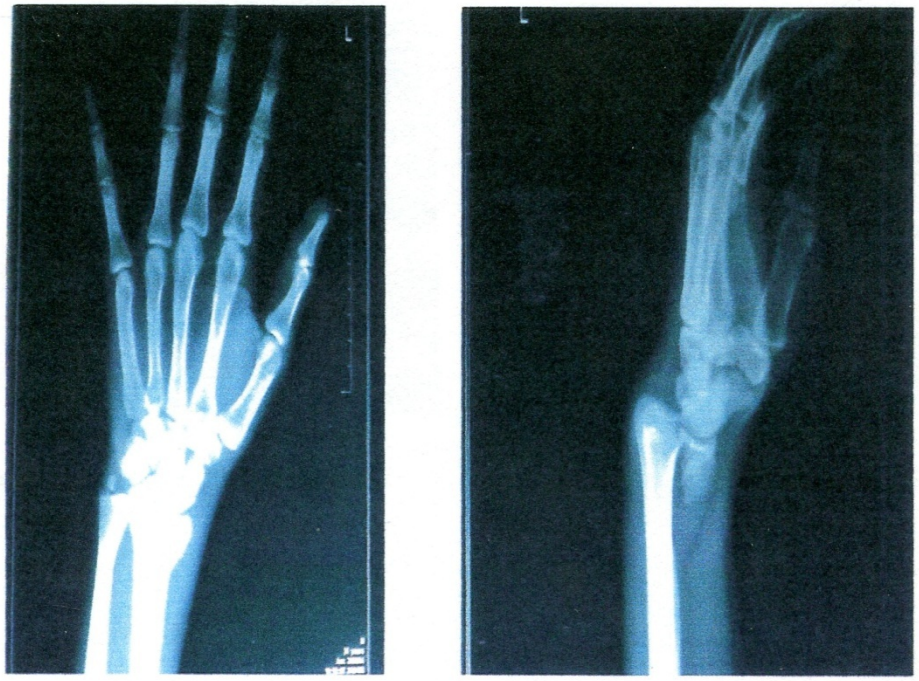
Pronation

Supination

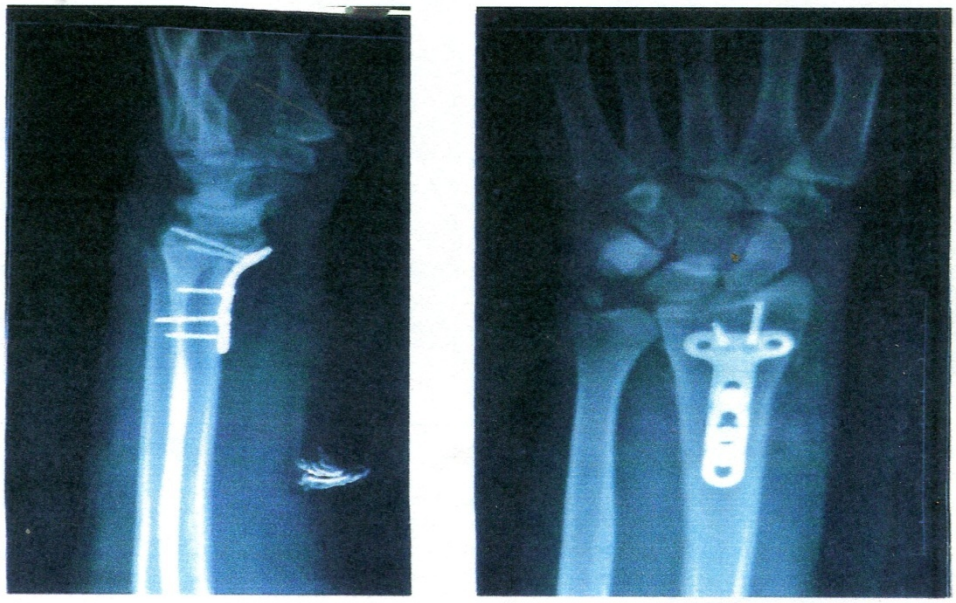
CASE : 4

51 YEARS OLD MALE CAME WITH ALLEGED HISTORY OF RTA

Image : 19



Preop



Postop

RANGE OF MOTIONS

Image : 20

Dorsi Flexsion

Palmar Flexion

Supination

Pronation

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CASE RECORD FORM

Name	:	
Age	:	
Sex	:	
Ip/op No	:	
Address	:	
Phone No	:	
Date of Admission	:	
Date of Surgery	:	
Date of Discharge	:	
Chief Complaints	**:**	
Pain	:	
Swelling	:	
Disability	:	
Mode of Injury	**:**	
RTA	:	
Assault	:	
Fall	:	
Domestic Accident	:	
H/o presenting illness	**:**	
Duration of injury	:	
Pain	:	Site of pain
		Increase in pain or movement
Movements	:	Normal/Restricted
Associated Injuries		

Past H/o **:**

H/o Diabetes :

H/o Hypertension **:**

H/o CAD :

H/o other chronic disorder:

Family H/o **:**

Personal H/O **:**

H/O Smoking :

H/O Chronic Alcoholism :

General Physical Examination

PR	:	BP:
Pallor	:	Icterus:
Cyanosis	:	Edema:

Systemic Examination

CVS :

RS :

PA :

CNS :

Local Examination

Side Involved : Right / Left

Type : Simple / Compound

Swelling : Present / Absent

Associated Injury :

State of Wound : Clean / Contaminated / Infected

Neurological Deficit : Present / Absent

Vascular Injury : Present / Absent

Management

External Fixation :

Type of Anaesthesia :

Size of Schanz pins :

No. of schanz pins used :

Position of Wrist :

Neutral :

Palmar flexion :

Dorsiflexion :

Pronation :

Supination :

Ulnar deviation :

External fixator Removed on:

Internal fixation

Type of Anesthesia:

Implant used: Buttress plate/ Locking Compression plate

Buttress plate:

Size:

No. of holes:

No. of screws:

Screw size:

Locking Compression plate:

Size :

Kwire :

No. of wires :

Size :

Sutures Removed on :

Any External Immobilisation : Cast / Slab / Fixator

Follow up Evaluation :

Clinical Examination :

Subjective

Pain :

Swelling :

Limitation of Movement :

Disability :

Restriction of Activity :

Other Complaints :

Objective:

Dorsiflexion

Palmar flexion

Radial Deviation

Ulnar Deviation

Pronation

Supination:

Grip:

Tenderness in Distal Radioulnar Joint:

Tenderness in Radiocarpal Joint:

Residual deformity: Radial Deviation Hand / Ulnar styloid Prominence / Dorsal Tilt

Complication :

Nerve Injury :

Infection :

Stiffness of fingers :

Re displacement :

Pin Site Infection :

Loosening :

Rupture of Extensor pollicis Longus Tendon:

Carpal Tunnel Syndrome :

Shoulder stiffness :

Anaesthetic complication :

Any other complication :

CONSENT FORM

PART 1 of 2

INFORMATION FOR PARTICULARS OF THE STUDY'

Dear Participants,

We welcome you and thank you for your keen interest in participation in this research project. Before you participate in this study, it is important for you to understand why this research is being carried out. This form will provide you all the relevant details of this research. It will explain nature, Purpose, benefits, risks, discomforts, precautions and information about how these projects will be carried out. It is important that you read and understand the contents of form carefully. This form may contain certain scientific terms and hence if you have any doubts or if you want more information, you are free to ask study person or contact person mentioned before you give your consent and also at any time during the entire course of the project.

1. **NAME OF PRINCIPAL INVESTIGATOR:**

Dr.T. Vishnu,
Post graduate Student,
Orthopedics,
SMIMS, Kulasekharam.

2. **NAME OF THE GUIDE:**

NAME	:	Dr.S.Ramaguru MS Ortho
DESIGNATION	:	Professor
DEPARTMENT	:	Department of Orthopedics
INSTITUTE & PLACE	:	SMIMS, Kulasekharam

3. NAME OF THE CO GUIDE:

NAME	:	Dr.K.C.Mathew MS Ortho
DESIGNATION	:	Professor
DEPARTMENT	:	Department of Orthopedics
INSTITUTE & PLACE	:	SMIMS, Kulasekharam

NAME OF THE CO GUIDE (2):

NAME	:	Dr.M.Mohammed Sheriff MS Ortho
DESIGNATION	:	Associate Professor
DEPARTMENT	:	Department of Orthopedics
INSTITUTE & PLACE	:	SMIMS, Kulasekharam

4. INSTITUTE:

SreeMookambika Institute of Medical Sciences, Kulasekharam, Kanyakumari District, Tamilnadu – 629 161

5. TITLE OF THE STUDY:

A COMPARATIVE ANALYSIS OF SURGICAL MANAGEMENT USING EXTERNAL FIXATION AND INTERNAL FIXATION IN UNSTABLE COMMINUTED FRACTURE OF DISTAL RADIUS.

6. BACKROUND INFORMATION:

Fracture of distal radius is the most common fracture. Comminuted unstable fracture of distal radius is best treated by surgical methods such as external fixation and internal fixation.

7. AIMS AND OBJECTIVES:

To compare the effects of external fixation and internal fixation in surgical management of unstable comminuted fracture of distal radius.

8. SCIENTIFIC JUSTIFICATION STUDY:

Scientists – Cooney W.P, Ellis J, Charles Melone, Roger Anderson and many others described benefits of surgical intervention in management of unstable comminuted fracture of distal radius.

They have shown these techniques gave good anatomical and functional outcomes compared to conservation methods.

9. PROCEDURE FOR THE STUDY:

Patients with distal end of radius are clinically examined.

X ray Investigation of wrist joint are taken in SMIMS.

If it shows comminuted unstable fractures of distal radius, patient is admitted in hospital, in orthopedics ward.

Preoperatively treated with analgesics and antibiotics provisional reduction and immobilization with plaster of paris.

They observe for any progressive swelling and neurovascular complications

Patients were divided into Group I and II randomly and analyzed for fitness for Surgery.

Group I Patients are treated by External fixation. Group II Patients are treated by Internal Fixation.

Post operatively patients were observed for acute complications.

Check X-ray taken and assumed for quality of reduction and then patient followed

for every week, for month and then followed for 3 months, 6 months and 1 year

post operative X –rays were taken in SMIMS.

Post operative return of functional stability was analyzed and assessed.

10. EXPECTED RISK FOR PARTICIPANTS:

Risk of Anaesthesia, post operative complication such as Infection, failure of return of normal wrist joint function.

11. EXPECTED BENEFITS OF RESEARCH FOR

There may be any personal benefits but this study will be beneficial for betterment of health sector.

12. MAINTANANCE OF COFIDENTIALITY:

All data collected for the study will be kept confidentially and would reflect on general statistical evaluation only and would not reveal any personal details.

13. WHY I HAVE CHOOSED IN THIS STUDY:

As you are suffering from comminuted unstable fracture of distal radius, you are chosen for the study.

14. HOW MANY PEOPLE WILL BE IN THE STUDY:

68

15. AGREEMENT OF COMPENSATION TO THE PARTICIPANT:

Yes

16. ANTICIPATED PRORATED PAYMENT, IF ANY, TO THE PARTICIPANTS OF THE STUDY:

Nil

17. CANI WITHDRAW FROM STUDY AT ANY TIME DURING THE STUDY PERIOD:

Yes

18. IF THERE IS ANY NEW FINDING / INFORMATION WOULD I BE INFORMED:

Yes

19. EXPECTED DURATION OF PARTICIPANT'S PARTICIPATION IN THE STUDY:

One Year

20. ANY OTHER PERTINENT INFORMATION:

No.

21. WHOM DO I CONTACT FOR FURTHER INFORMATION:

FOR ANY STUDY RELATED QUERIES YOU ARE FREE TO CONTACT:

Dr.T. Vishnu,

Post graduate Student,
Orthopedics,
SMIMS, Kulasekharam.
Cell : 95851 50350
Vishnuthirunthaiyan1990@gmail.com

Place :Kulasekharam
Date :

Signature of Primary Investigator

CONSENT FORM

PART 2 of 2

PARTICULARS CONSENT FORM

The details of the study have been explained to me in writing and the details have been fully explained to me. I am aware that the results of the study may not be directly beneficial to me but will help in the advancement of medical sciences. I confirm that I have understood the study and had the opportunity to ask questions. I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without the medical care that will normally be provided by the hospital being affected. I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose (s). I have been given an information sheet giving details of the study. I fully consent to participate in the study titled "**A COMPARATIVE ANALYSIS OF SURGICAL MANAGEMENT USING EXTERNAL FIXATION AND INTERNAL FIXATION IN UNSTABLE COMMINUTED FRACTURE OF DISTAL RADIUS".**

Serial no / Reference no:

Name of the Participant Address of the Participant

Contact number of the Participant:

Signature / Thumb impression of the participant / Legal guardian

Witnesses :

1.

2.

Date :

Place :

ஒப்புதல் படிவம்

பகுதி 1

பங்கேற்பாளர்களுக்கு வேண்டிய விவரங்கள்

அன்பார்ந்த தன்னார்வர்களே

நீங்கள் இவ்வாராய்ச்சியில் பங்கு பெறுவதற்காக காட்டிய ஆர்வத்திற்காக உங்களுக்கு நன்றி கூறி வரவேற்கிறோம். இவ்வாராய்ச்சியில் பங்கு பெறுவதற்கு முன்னர், எதற்காக இவ்வராய்ச்சி நடத்தப்படுகிறது என்பதை தெரிந்துகொள்வது அவசியம். இப்படிவத்தின் மூலம் இவ்வராய்ச்சியை பற்றியும், இதனால் வரும் நன்மைகள், பலன்கள், ஆபத்துக்கள், பாதைகள் முன்னெச்சரிக்கைகள் மற்றும் இவ்வராய்ச்சியின் வழிமுறைகள் உங்களுக்கு விளக்கப்படும். எனவே, இதனை கவனமாக படித்து புரிந்து கொள்வது மிகவும் அவசியம். இப்படிவத்தில் அங்காங்கே அறி**வி**யல் துறையைச் சார்ந்த வார்த்தைகள் உபயோகப்படுத்தப்பட்டிருக்கலாம். எனவே, உங்களுக்கு ஏதாவது சந்தேகங்களோ, அல்லது விவரங்களோ தேவைப்பட்டால், இவ்வாராய்ச்சிக்கு சம்மதம் தெரிவிக்கும் முன்னரோ அல்லது இவ்வராய்ச்சியில் இருக்கும் எந்நேரமோ கீழ்கண்ட நேயரை தொடர்புகொண்டு சந்தேகங்களை தெளிவுபடுத்திக் கொள்ளலாம்.

1. தலைமை விசாரணை அதிகாரியின் பெயர் :(Principal Investigator)

   டாக்டர் : தி. விஷ்னு

   பிரிவு : எலும்பு முறிவு சிகிட்சை பிரிவு

   நிறுவனம் : ஸ்ரீ மூகாம்பிகா இன்ஸ்டிட்யூட் ஆப் மெடிக்கல் சயின்ஸ், குலசேகரம்.

2. வழி நடத்துபவரின் பெயர் : டாக்டர். ராமகுரு

   பிரிவு : எலும்புமுறிவு சிகிட்சை பிரிவு

   நிறுவனம் : ஸ்ரீ மூகாம்பிகா இன்ஸ்டிட்யூட் ஆப் மெடிக்கல் சயின்ஸ், குலசேகரம்.

3. உதவி வழிநடத்துபவரின் பெயர் : டாக்டர். கே.சி. மேத்யூ

   தகுதி : புரோபஸர்

   பிரிவு : எலும்பு முறிவு சிகிட்சை பிரிவு

   நிறுவனம் : ஸ்ரீ மூகாம்பிகா இன்ஸ்டிட்யூட் ஆப் மெடிக்கல் சயின்ஸ், குலசேகரம்.

உதவி வழி நடத்துபவரின் பெயர் : டாக்டர். முகமது ஷெரிப்

தகுதி : புரோபஸர்

பிரிவு : எலும்பு முறிவு சிகிட்சை பிரிவு

நிறுவனம் : ஸ்ரீ மூகாம்பிகா இன்ஸ்டிட்யூட் ஆப் மெடிக்கல் சயின்ஸ், குலசேகரம்.

4. நிறுவனத்தின் முகவரி மற்றும் விவரங்கள் :

ஸ்ரீ மூகாம்பிகா இன்ஸ்டிட்யூட் ஆப் மெடிக்கல் சயின்ஸ்,

வி.பி.எம்.ஹாஸ்பிட்டல்,

காம்பிளக்ஸ், படநிலம், குலசேகரம், கன்னியாகுமரி மாவட்டம்.

5. ஆராய்ச்சியின் தலைப்பு :

நொறுங்கிய நிலையில் ரேடியஸ் அடிப்பகுதி எலும்பு முறிவில் செய்யப்படும் அறுவைசிகிட்சைகள் எக்ஸ்டர்னல்(External) பிக்சேஷன்மற்றும் இன்டர்னல் (Internal) ஃபிக்சேஷன் ஆகியவற்றில் சிறந்ததை கண்டறிவது.

6. பின்புலத் தகவல் :

ரேடியஸ் எலும்பு முறிவு மிகவும் அதிகமாக ஏற்படுகிற எலும்பு முறிவு. அது அறுவை சிகிட்சைகள் மூலம் சிறந்த முறையில் குணப்படுத்த முடிகிறது.

7. ஆய்வின் நோக்கம் :

எக்ஸ்டர்னல் இன்டர்னல் ஃபிக்சேஷன் ஆகிய இரு அறுவை சிகிட்சைகளில் நன்மைகள் நலன்கள், பக்கவிளைவுகள் ஆராயப்படுகிறது. இந்த இரு அறுவை சிகிட்சைகளில் சிறந்தவை அறியப்படுகிறது.

8. ஆய்வின் அறிவியல் நியாயம் :

அறிவியல் ஆராய்ச்சியாளர்கள் பலர் ரேடியஸ் அடிபகுதி எலும்பு முறிவில் அறுவை சிகிட்சையின் மிகச்சிறந்த பயனை ஆராய்ச்சி செய்து அறிந்து உள்ளனர். அது அறுவை சிகிட்சை அல்லாத சிகிட்சையை விட மிகவும் பயன் உள்ளது என்பதை அறிந்து உள்ளனர்.

9. ஆய்வின் வழிமுறை :

ரேடியஸ் அடிபகுதி எலும்பு முறிவு நோயாளிகள் மருத்துவர்களால் ஆராயப்படுகிறார்கள். அவர்களுக்கு எக்ஸ்ரே எடுக்கப்படுகிறது. அதில் எலும்பு முறிவு தெரிந்தால் அவர்கள் உள்நோயாளியாக அனுமதிக்கப்படுகிறார்கள்.

அறுவை சிகிச்சை முன் வ நிவாரணிகள், ஆன்டிபயாடிக்ஸ் கொடுக்கப்படுகிறது. பின் அவர்கள் பகுதி 1 மற்றும் பகுதி 2 ஆக பிரிக்கப்படுகிறார்கள். பகுதி 1 நோயாளிகள் எக்ஸ்டர்னல் ஃபிக்சேஷன் மற்றும் பகுதி 2 நோயாளிகள் இன்டர்னல் ஃபிக்சேஷன் மூலம் குணப்படுத்தப்படுகின்றனர். அறுவை சிகிட்சையின் போது அவர்கள் ஆராயப்படுகிறார்கள். அறுவை சிகிச்சை முடிந்த பின் அவர்கள் 3 மாதம் முதல் 6 மாதம் மற்றும் 1 வருடம் தொடர்ந்து கண்காணிக்கப்படுகிறார்கள். எக்ஸ்ரேக்கள் எடுக்கப்படுகிறது சிகிட்சைக்கு பின் அவர்கள் அடைந்த பலன் மற்றும் பின்விளைவுகள் ஆராயப்படுகிறது.

அறுவை சிகிட்சையின் போது அவர்கள் ஆராயப்படுகிறார்கள்.அறுவை சிகிட்சை முடிந்த பின் அவர்கள் 3 மாதம் முதல் 8 மாதம் மற்றும் 1 வருடம் தொடர்ந்து கண்காணிக்கப்படுகிறார்கள். எக்ஸ்ரோக்கள் எடுக்கப்படுகிறது சிகிச்சைக்கு பின் அவர்கள் அடைந்த பலன் மற்றும் பின்விளைவுகள் ஆராயப்படுகிறது.

10. பங்கேற்பாளர்களுக்கு இவ்வாராய்ச்சியினால் எதிர்பார்க்கப்படும் ஆபத்துகள் :

மயக்க மருந்தினால் வரும் பின்விளைவு, நோய் தொற்று மற்றும் முறிந்த எலும்பு சரியாக சேராமல் போகுதல்.

11. பங்கேற்பாளர்களுக்கு இவ்வராய்ச்சியினால் எதிர்பார்க்கப்படும் நன்மை :

இதனால் தனிப்பட்ட நன்மை ஏற்பட வாய்ப்பில்லை ஆனால் இந்த ஆய்வு மருத்தவத்துறை முன்னேற்றத்திற்கு உதவும்.

12. ஆராய்ச்சியை பற்றிய தகவல்கள் பாதுகாக்கப்படும் தன்மை :

இவ்வராய்ச்சியை பற்றி தகவல்கள் சேகரிக்கப்பட்ட தகவல்கள் அனைத்தும் ரகசியமாக பாதுகாக்கப்படும்.

13. இவ்வாராய்ச்சிக்கான நீங்கள் தேர்ந்தெடுக்கப்பட்டுள்ள காரணம் :

நீங்கள் ரேடியஸ் அடிபகுதி எலும்பு முறிவினால் பாதிக்கப்பட்டுள்ளதால் நீங்கள் இவ்வாராய்ச்சிக்கு தேர்ந்தெடுக்கப்பட்டுள்ளிர்கள்.

14. எத்தனை பேர் இவ்வராய்ச்சியில் பங்கு கொள்வார்கள்.68

15. நஷ்ட ஈடு கொடுப்பதற்கான ஒப்பந்தம்? (இதன் மூலம் ஏற்படும் விளைவுகளுக்கும்) :

சம்மதம்

16. இந்த ஆய்வில் பங்கு கொள்ள கொடுக்கப்படும் தொகை :

இல்லை

17. நான் இந்த ஆராய்ச்சியில் எந்நேரத்திலும் வெளிவர இயலுமா?

ஆம்

18. ஏதேனும் புதிய தகவல்களோ கண்டுபிடிப்புகளோ இவ்வராய்ச்சியில் கண்டறியப்பட்டால் என்னிடம் விவரம் தெரிவிக்கப்படுமா?

ஆம்

19. இவ்வாராய்ச்சிக்கான கால வரையறை :

ஒரு வருடம்

20. இவ்வராய்ச்சிக்கான பற்றிய இதர தகவல்கள் :

எதுவும் இல்லை

21. ஏதாவது சந்தேகமா, விவரங்களுக்கோ யாரை தொடர்புக் கொள்ள வேண்டும்?

கீழ்கண்ட நபருக்கு :

டாக்டர். தி. விஷ்ணு, எம்.எஸ் (எலும்பு முறிவு சிகிட்சை)

பிரிவு : எலும்பு முறிவு சிகிச்சை

நிறுவனம்:ஸ்ரீ மூகாம்பிகா இண்ஸ்டிட்யூட் ஆப் மெடிக்கல் சயின்ஸ், குலசேகரம்.

தொலைபேசி எண் : 95851 50350

வலை முகவரி :vishnuthirunthaiyan1990@gmail.com

இடம் :

தேதி :

முதன்மை விசாரணை அதிகாரியின் கையொப்பம் :

ஒப்புதல் படிவம்
பாகம்-2

இந்த ஆராய்ச்சியின் தகவல்கள் அனைத்தும் என்னிடம் தெளிவாக எழுத்துமூலம் விளக்கப்பட்டுள்ளது. இந்த ஆராய்ச்சியின் முடிவுகள் எனக்கு நேரடியாக பயன்பராவிட்டாலும் மருத்துவத்துறையின் முன்னேற்றத்திற்கு பயன்படும் என்பதை அறிவேன். இவ்வாராய்சியைப் பற்றி நான் தெளிவாக புரிந்துக் கொண்டுள்ளேன். நான் தானாக முன்வந்து இதில் பங்குப் பெறுகிறேன். என்பதை அறிவேன். இதி ருந்து எந்த நேரமும் எக்காரணமும் கூறாமல் வந்தாலும் இந்த மருத்துவமனையில் எனக்கு கிடைக்கும் மருத்துவ உதவி எவ்விதத்திலும் பாதிக்கப்படாது என்பதையும் அறிவேன். இவ்வாராய்ச்சியின் மூலம் வரும் முடிவுகள் மற்றும் தகவல்களை அறிவியல்துறையின் பயன்பாடுகளுக்கு (மட்டுமே) உபயோகப்பட்டிக்கொள்ள சம்மதிக்கிறேன். எனக்கு இவ்வாராய்ச்சியைப் பற்றிய விரிவான தகவல்கள் அடங்கிய படிவம் தரப்பட்டுள்ளது.

நான் "**நொறுங்கிய நிலையில் ரேடியஸ் அடிப்பகுதி எலும்பு முறிவில் செய்யப்படும் அறுவை சிகிட்சைகள் எக்ஸ்டர்னல்**(External) **பிக்சேஷன்மற்றும் இன்டர்னல்**(Internal) **ஃபிக்சேஷன் ஆகியவற்றில் சிறந்ததை கண்டறிவது**." என்கிற ஆராய்ச்சியில் பங்கேற்க முழுமனதுடன் சம்மதிக்கிறேன்.

பங்கு கொள்பவரின் தொடர், மருத்துவ எண் :

பங்கு கொள்பவரின் பெயர் :

18 வயதிற்கு கீழ் உள்ளவர்களுக்கு பாதுகாவலரின் கையொப்பம்:

முகவரி

தொலை தொடர்பு எண் :

பங்கு கொள்பவர் பராமரிப்பவர் கையொப்பம்/பெருவிரல் சுவடு :

சாட்சி 1

சாட்சி 2

தேதி:
இடம்: குலசேகரம்

സമ്മത പത്രം

ഭാഗം – 1

ഈ പഠനത്തിൽ പങ്കെടുക്കുന്നവർക്കുള്ള അിറവിനായ് ,

പ്രിയമുള്ള സേവനദാതാക്കളെ,

ഈ ഗവേഷണ പഠനത്തിൽ പങ്കെടുക്കാൻ അതീവതാല്പര്യം കാണിച്ച നിങ്ങളേവർക്കും സ്വാഗതം ഓതുന്നു, നന്ദി രേഖപ്പെടുത്തുന്നു.

ഈ പഠനത്തിൽ പങ്കെടുക്കുന്നതിനു മുൻപ് ഗവേഷണത്തിന്റെ ഉദ്ദേശമെന്താണെന്ന് നിങ്ങൾ എല്ലാവരും മനസ്സിലാക്കേതാണ്. ഇതോടൊന്നിച്ച് വച്ചിരിക്കുന്ന ഫാറത്തിൽ ഗവേഷണത്തിന്റെ രൂപവും, ഭാവവും വിവരങ്ങളും കാണിച്ചുട്ടു്. ഗവേഷണത്തിന്റെ സ്വഭാവം, ഉദ്ദേശം, പ്രയോജനം, അപകടസാദ്ധ്യതകൾ, സ്വീകരിക്കേ മുൻ കരുതലുകൾ തുടങ്ങിയ വിവരങ്ങൾ ഈ പഠനത്തിൽ നിന്നും ഗ്രഹിക്കാവുന്നതാണ്. ഈ ഫാറം ശരിയായും ശ്രദ്ധാപൂർവ്വവും വായിച്ചു മനസ്സിലാക്കേത് വളരെ അത്യാവശ്യമായ കാര്യമാണ്.

ഈ ഫാറത്തിൽ ചില ശാസ്ത്രീയ പദങ്ങൾ ഉള്ളതിനാൽ സംശയങ്ങൾ വന്നാൽ ചോദിച്ചു മനസ്സിലാക്കേതും കൂടുതൽ വിവരങ്ങൾ പഠിതാക്കളോടൊ താഴെപറയുന്ന വ്യക്തിയോടൊ അതാതുസമയങ്ങളിൽ ചോദിച്ചു സംശയ നിവർത്തിവരുത്തേതുമാണ്.

1. പ്രധാന അന്വേഷകന്റെ പേര് : **ഡോ. വിഷ്ണു. റ്റി**
ബിരുതാനന്തര വിദ്യാർത്ഥി,
ഡിപ്പാർട്ട്മെന്റ് ഓഫ് ഓർത്തോപീഡിക്സ്,
ശ്രീ മൂകാംബിക ഇൻസ്റ്റിറ്റ്യൂട്ട് ഓഫ് മെഡിക്കൽ
സയൻസ്,
കുലശേഖരം - 629 161.

2. മാർഗ്ഗദർശിയുടെ പേര് : **ഡോ. രാമഗുരു. എം. എസ്. ഓർത്തോ**
പ്രൊഫസർ
ഡിപ്പാർട്ട്മെന്റ് ഓഫ് ഓർത്തോപീഡിക്സ്,
ശ്രീ മൂകാംബിക ഇൻസ്റ്റിറ്റ്യൂട്ട് ഓഫ് മെഡിക്കൽ
സയൻസസ്,
കുലശേഖരം- 629 161.

3. സഹ മാർഗ്ഗദർശിയുടെ പേര് : **ഡോ. കെ. സി. മാത്യൂ. എം. എസ് ഓർത്തോ**
പ്രൊഫസർ,
ഡിപ്പാർട്ട്മെന്റ് ഇ ഓഫ് ഓർത്തോപീഡിക്സ്,
ശ്രീ മൂകാംബിക ഇൻസ്റ്റിറ്റ്യൂട്ട് ഓഫ് മെഡിക്കൽ
സയൻസസ്,
കുലശേഖരം- 629 161.

4. സ്ഥാപനത്തിന്റെ പേരും മേൽവിലാസവും : **ശ്രീ. മൂകാംബിക ഇൻസ്റ്റിറ്റ്യൂട്ട് ഓഫ് മെഡിക്കൽ സയൻസസ്**
പടനിലം, കുലശേഖരം,
കന്യാകുമാരി - 629 161.
തമിഴ്നാട്.

5. പഠനത്തിന്റെ പേര് :

കമ്മിന്യൂട്ടട് അൺസ്റ്റേബിൾ ഫ്രാക്ച്ചർ ഡിസ്റ്റൽ റേഡിയസ് എക്സ്ടേണൽ ഫിക്സേഷൻ ഇന്റേണൽ ഫിക്സേഷൻ ഉപയോഗിച്ചുള്ള സർജറി വഴി കൂടുതൽ ഭേദമാകും.

6. വിവരം നൽകുന്നതിന്റെ പശ്ചാത്തലം

ഫ്രാക്ച്ചർ സിസ്റ്റൽ റേഡിയസ് പൊതുവായി കാണുന്നതാണ്. കമ്മിന്യൂട്ടട് ഫ്രാക്ച്ചർ ഡിസ്റ്റൽ റേഡിയസ് എക്സടേണൽ ഫിക്സേഷനും ഇൻട്ടേണൽ ഫിക്സേഷൻ മുതലായ സർജറി ഉപകരണങ്ങൾ ഉപയോഗിച്ച് കൂടുതൽ നല്ലതായി ചികിത്സിക്കാം.

7. ലക്ഷ്യങ്ങളും ഉദ്ദേശങ്ങളും

- കമ്മന്യൂട്ടട് അൺസ്റ്റേബിൾ ഫ്രാക്ച്ചർ ഡിസ്റ്റൽ റേഡിയസ് വന്ന 30 രോഗികളെ ഇന്റേണൽ ഫിക്സേഷനും എക്സ്റ്റേണൽ ഫിക്സേഷനും വഴി ചികിത്സിച്ചതിന്റെ പഠനം.
- എക്സ്റ്റേണൽ, ഇന്റേണൽ ഫിക്സേഷന്റെ സ്വാഭാവം, ഉദ്ദേശം, പ്രയോജനം, അപകട സാദ്ധ്യതകൾ, സ്വീകരിക്കേ മുൻ കരുതലുകൾ തുടങ്ങിയവ ഗ്രഹിക്കാം.
- കമ്മിന്യൂട്ടട് അൺസ്റ്റേബിൾ ഡിസ്റ്റൽ റേഡിയസ് ഫ്രാക്ച്ചർ ഏത് സർജറി ഉപയോഗിച്ചു കൂടുതൽ നന്നായി ചികിത്സിക്കാൻ പറ്റുമോ എന്ന് ഗ്രഹിക്കാൻ.

8. ഈ പഠനത്തിന്റെ ശാസ്ത്രീയ ന്യായീകരണം

ഡിസ്റ്റൽ റേഡിയസീന്റെ അൺസ്റ്റേബിൾ കമ്മന്യൂട്ടട് ഫ്രാക്ച്ചറിന്റെ ശസ്ത്രക്രിയമൂലം ഉാകുന്ന ഗുണങ്ങളെപ്പറ്റി ശാസ്ത്രജ്ഞന്മാരായ വൂണി,W.P, എല്ലിസ്.J, ചാൾസ് മീറ്റോൺ, റോജർ അൺട്രേസൺ തുടങ്ങിയവർ വിശദീകരിച്ചു.

അവർ വഴിതെളിച്ച ഈ രീതികൾ സാധാരണ ചികിത്സയെ താരതമ്യപ്പെടുത്തി നോക്കുമ്പോൾ അനാട്ടമിക്കായി വളരെ മുന്നേറ്റം കാണിക്കുന്നു.

9. ഈ പഠനത്തിന്റെ നടപടിക്രമം

രോഗികളുടെ ഡിസ്റ്റൽ എൻഡ് ഓഫ് റേഡിയസ് പരിശോധിച്ചു.

റിസ്റ്റ് ജോയിന്റിന്റെ എക്സ്റേ എടുത്തു. അതിൽ കമ്മിന്യൂട്ടട് അൺസ്റ്റേബിൾ ഡിസ്റ്റൽ റേഡിയസ് ഫ്രാക്ച്ചർ ഉന്നെു കാണിച്ചാൽ രോഗിയെ ഓർത്തോപീഡിക് വാർഡിൽ അഡ്മിറ്റ് ചെയ്യും. ശസ്ത്രക്രിയയ്ക്ക് മുന്നോടിയായി വേദനസംഹാരികളും ആന്റിബയോട്ടിക്സും കൊടുത്തു ചികിത്സിക്കും.

രോഗികളെ ഗ്രൂപ്പ് ഒന്നും, ഗ്രൂപ്പ് ര ും ആയി വിഭാഗിച്ചിച്ച് ശസ്ത്രക്രിയക്ക് അനുയോജ്യമാണോ എന്ന് പരിശോധിക്കും.

ഗ്രൂപ്പ് ഒന്ന് രോഗികളെ എക്സ്റ്റേണൽ ഫിക്സേഷൻ വഴിയും ഗ്രൂപ്പ് ര ് രോഗികളെ ഇൻട്ടേണൽ ഫിക്സേഷൻ വഴിയും ചികിത്സിക്കും.

രോഗികൾക്ക് വരാവുന്ന പാർശ്വഫലങ്ങളെപ്പറ്റി ശസ്ത്രക്രിയകൾക്ക് ഇടയിൽ നിരീക്ഷിക്കും ശസ്ത്രക്രിയകൾക്കു ശേഷം ഗ്രൂപ്പ് ഒന്നിലെയും ഗ്രൂപ്പ് ര ിലെയും രോഗികളെ 3 മാസം, 6 മാസം, ഒരുവർഷം വരെയും നിരീക്ഷിക്കും. ശസ്ത്രക്രിയകൾക്ക് ശേഷമുള്ള അനാട്ടമിക്കലിയും ഫങ്ഷണലിയും ആയ സ്ഥിരതയെയും ശസ്ത്രക്രിയയ്ക്ക് ശേഷമുള്ള പാർശ്വഫലങ്ങളെയും നിരീക്ഷിക്കും.

ഫങ്ഷണൽ സ്റ്റാറ്റസ് അിറയാനായി റാഷ് സ്കോർ പരിശോധിക്കും. എല്ലാരോഗികളിലും

10. പങ്കെടുക്കുന്നവർക്ക് വരാവുന്ന അപകടസാധ്യത അനസ്തീഷ്യകാരണം വരാവുന്ന അപകടങ്ങൾ

ഓപ്പറേഷനുശേഷം വരാവുന്ന അണുബാധ, കൈക്കൊഴയുടെ ഉപയോഗം നഷ്ടമാക്കുക.

11. പങ്കെടുക്കുന്നവർക്ക് ഗവേഷണഫലമായി ഉാവുന്ന പ്രയോജനം

ഈ പഠനത്തിൽ പങ്കെടുക്കുന്നവർക്ക് വ്യക്തിപരമായ പ്രയോജനമുാകില്ലെങ്കിലും ആരോഗ്യമേഖലയ്ക്ക് ഈ പഠനം വഴി ഗുണമുാകും.

12. രഹസ്യ വിവരങ്ങൾ പുറത്തറിയിക്കാതെ സൂക്ഷിക്കൽ

നിങ്ങളിൽ നിന്ന് ഞങ്ങൾക്ക് ലഭിക്കുന്ന എല്ലാവിവരങ്ങളും രഹസ്യവുമായ് സൂക്ഷിക്കുന്നതായിരിക്കും.

13. എന്നെ എന്തിനാണ് ഈ പഠനത്തിനായ് തെരഞ്ഞെടുത്തത്.

നിങ്ങൾ കമ്മിന്യൂട്ടഡ് ഡിസ്റ്റൽ റേഡിയസ് ഫ്രാക്ച്ചറായി ആശുപത്രിയിൽ വന്നതുകൊ്.

14. ഈ പഠനത്തിൽ എത്രപേർ പങ്കെടുക്കുന്നു് ? – 68

15. ഈ പഠനം മൂലമുാകുന്ന ക്ഷതങ്ങൾക്ക് നഷ്ടപരിഹാരത്തിനുള്ള സമ്മതം

സമ്മതം

16. പഠനത്തിൽ പങ്കാളികളാകുന്നവർക്ക് മുൻകൂർ കണക്കിൽ പ്രകാരം നൽകേ പ്രതിഫലത്തിന്റെ തോത് – ബാധകമല്ല

17. എനിക്ക് ഈ പഠനത്തിന്റെ കാലഘട്ടത്തിനിടയിൽ എപ്പോൾ വേണമെങ്കിലും പിൻമാറാൻ അവകാശമുോ ? അതെ

18. പുതിയതായി എന്തെങ്കിലും കുപിടിച്ചാൽ എന്നെ അിറയിക്കുമോ ? അതെ

19. ഈ പഠനം എത്ര സമയമുാകും ? ഒരു വർഷം

20. മറ്റെന്തെങ്കിലും വിവരം ? ഇല്ല

21. കൂടുതൽ വിവരങ്ങൾക്ക് ഞാൻ ആരോടാണ് സമ്പർക്കം പുലർത്തേത്

താഴെ കൊടുത്തിരിക്കുന്ന വില

ഡോ. റ്റി. വിഷ്ണു
ബിരുതാനന്തര വിദ്യാർത്ഥി,
ഡിപ്പാർട്ട്മെന്റ് ഓഫ് ഓർത്തോപീഡിക്സ്,
ശ്രീ മൂകാംബിക ഇൻസ്റ്റിറ്റ്യൂട്ട് ഓഫ് ഡെന്റൽ സയൻസ്,
കുലശേഖരം - 629 161.
Ph: 95851 50350
Email: vishnuthirunthaiyan1990@gmail.com

സ്ഥലം: കുലശേഖരം

തീയതി :

പ്രധാന അന്വേഷകന്റെ കൈയ്യൊപ്പ്

പങ്കെടുക്കുന്ന ആളുടെ കൈയ്യൊപ്പ്

സമ്മതപത്രം

ഭാഗം – 2

പങ്കെടുക്കുന്നവരുടെ സമ്മത പത്രം

വാചികമായും എഴുതിയും ഈ പഠനത്തെപ്പറ്റിയുള്ള വിവരങ്ങൾ എനിക്ക് പൂർണ്ണമായി മനസ്സിലാക്കിതന്നിട്ടു്. ഈ പഠനത്തിന്റെ ഫലങ്ങൾ എനിക്ക് വ്യക്തിപരമായി പ്രയോജനം ചെയ്യുകയില്ലെങ്കിലും വൈദ്യശാസ്ത്രപരമായിട്ടുള്ള പുരോഗിതക്ക് സഹായകമാകുമെന്ന് എനിക്കറിയാം. ഈ പഠനംമൂലം എനിക്ക് ചില ചോദ്യങ്ങൾ ചോദിക്കുവാനുള്ള അവസരം നൽകുന്നു്. ഈ പഠനത്തിൽ പങ്കാളിയാകുന്നത് എന്റെ സ്വമനസ്സോടെ ഞാൻ ചെയ്യുന്നതാണ്. ഈ പഠനത്തിൽ നിന്നും പ്രത്യേക കാരണങ്ങളൊന്നും പറയാതെ ഏതുസമയത്തും പിൻമാറാൻ കഴിയുമെന്ന് എനിക്ക് ബോദ്ധ്യമു്. ഇതുമൂലം ആശുപത്രിയിൽ നിന്നും നൽകുന്ന വൈദ്യസഹായത്തിന് കുറവുാവുകയില്ലെന്നും എനിക്കറിയാം.

ഈ പഠനത്തിൽ നിന്നും ലഭിക്കുന്ന സ്ഥിതിവിവരണ കണക്കുകളോ, ഫലങ്ങളോ ശാസ്ത്രിയ പഠനങ്ങൾക്കുവേി ഉപയോഗിക്കുന്നതിന് ഞാൻ തടസ്സം നിൽക്കുന്നതല്ല. ഈ പഠനം സംബന്ധിച്ച് ചോദ്യങ്ങൾക്ക് നിങ്ങൾക്ക് ഈ താഴെ പറയുന്ന വിലാസത്തിൽ സമ്പർക്കം പുലർത്താവുന്നതാണ്.

സീരിയൽ നമ്പർ

പങ്കെടുക്കുന്ന ആളിന്റെ പേര് :

മേൽവിലാസം :

പങ്കെടുക്കുന്ന ആളിന്റെ ഒപ്പ് / വിരലടയാളം

സാക്ഷി :

1.

2.

സ്ഥലം :

തീയതി

ABBREVATIONS:

IF - Internal fixation.

EF - External fixation.

ORIF - Open Reduction And Internal Fixation .

RTA - Road Traffic Accident.

DASH - Disabilities of the Arm, shoulder and Hand.

DISABILITIES OF THE ARM, SHOULDER AND HAND

Please rate your ability to do the following activities in the last week by circling the number below the appropriate response

Sl. No.		No Difficulty	Mild Difficulty	Moderate Difficulty	Severe Difficulty	UNABLE
1.	Open a Tight or New jar	1	2	3	4	5
2.	Write	1	2	3	4	5
3.	Turn a Key	1	2	3	4	5
4.	Prepare a Meal	1	2	3	4	5
5.	Push open a heavy door	1	2	3	4	5
6.	Place an object on a sheet above your Head	1	2	3	4	5
7.	Do Heavy house hold Chores (Eg : Wash Walls, Wash Floors)	1	2	3	4	5

8.	Garden or Do yard work	1	2	3	4	5
9.	Make a bed	1	2	3	4	5
10.	Cary a Shopping Bag or Brief case	1	2	3	4	5
11.	Carry a Heavy object (over 10 lbs)	1	2	3	4	5
12.	Change a Light Bulb Over Head	1	2	3	4	5
13.	Wash or Blow dry Your air	1	2	3	4	5
14.	Wash Your back	1	2	3	4	5
15.	Put on a pullover sweater	1	2	3	4	5
16.	Use a Knife to cut food	1	2	3	4	5
17.	Recreational Activities which require Little Effort (Eg : Card Playing, Knitting, etc.)	1	2	3	4	5
18.	Recreational Activities in work you take some Force or Impact Through your arm, Shoulder or	1	2	3	4	5

	Hand Eg : Golf, hammering , Tennis etc.,					
19.	Recreational Activities in write you move your ARM Freely (Eg : Playing Friable, Badminton, etc)	1	2	3	4	5
20.	Manage Transportation needs (Getting from one place To another)	1	2	3	4	5
21.	Sexual Activities	1	2	3	4	5
22.	During the past week to what extent has your arm, Shoulder or Hand problem Interfered with your normal social activities with Family, Friends, Neighbours or Groups? (Circle Number)	1	2	3	4	5
23.	During the Past week, were you Limited in your work or other regular daily activities as a Result of your arm, Shoulder (Or) hand Problem.	1	2	3	4	5
24.	Arm, Shoulder or Hand Pain	1	2	3	4	5

25.	Arm, Shoulder or Hand pain when you Performed any specific activity	1	2	3	4	5
26.	Tingling (pins and Needles) In your arm,shoulder or Hand	1	2	3	4	5
27.	Weakness in your arm, shoulder or Hand	1	2	3	4	5
28.	Stiffness in your arm, Shoulder or Hand	1	2	3	4	5
29.	During the past week, How much difficulty has you had sleeping because of the pain in your ,arm, Shoulder or Hand?	1	2	3	4	5
30.	I Feel less capable, Less confident or less useful Because of my arm, Shoulder or Hand problem.	1	2	3	4	5

Dash Disability / Symptom score = $\left[\frac{(\text{Sum of in Response}) - 1}{n}\right] x25$

A Dash Score may not be calculated if there are greater than 3 Missing items.

FUNCTIONAL OUTCOME DETERMINED IN TERMS OF QUICK DASH SCORE

Sl. NO.	QUCIK DASH SCORE	LEVEL OF DIFFICULTY	FUNCTIONAL OUTCOME
1.	UPTO 11	NO DIFFICULTY	EXCELLENT
2.	12 – 22	MILD DIFFICULTY	GOOD
3.	23 – 33	MODERATE DIFFICULTY	FAIR
4.	34 – 44	SEVERE DIFFICULTY	POOR
5.	45 – 55	UNABLE	DISABLE

DASH – DISABILITY OF THE ARM, SHOULDER AND HAND

MASTER CHART

Patient No.	Age	Sex	Side	Procedure	Result
1	50	Male	LEFT	External Fixation	Good
2	70	Female	RIGHT	Internal Fixation	Fair
3	29	Male	RIGHT	Internal Fixation	Good
4	62	Male	LEFT	Internal Fixation	Good
5	43	Female	LEFT	Internal Fixation	Good
6	28	Male	LEFT	Internal Fixation	Good
7	57	Female	RIGHT	Internal Fixation	Good
8	43	Male	RIGHT	Internal Fixation	Good
9	63	Female	LEFT	Internal Fixation	Good
10	24	Male	RIGHT	Internal Fixation	Excellent
11	23	Male	RIGHT	Internal Fixation	Good
12	30	Male	RIGHT	Internal Fixation	Good
13	60	Female	LEFT	Internal Fixation	Good
14	45	Male	LEFT	Internal Fixation	Good
15	53	Male	LEFT	Internal Fixation	Good
16	34	Male	RIGHT	Internal Fixation	Good
17	19	Male	LEFT	Internal Fixation	Good
18	53	Male	LEFT	Internal Fixation	Good
19	38	Male	LEFT	External Fixation	Good
20	56	Female	LEFT	Internal Fixation	Good
21	32	Male	RIGHT	External Fixation	Fair
22	33	Female	LEFT	External Fixation	Good
23	18	Male	LEFT	Internal Fixation	Good
24	37	Male	RIGHT	External Fixation	Excellent

25	43	Female	LEFT	Internal Fixation	Good
26	52	Female	RIGHT	External Fixation	Good
27	61	Female	LEFT	External Fixation	Good
28	35	Female	LEFT	Internal Fixation	Good
29	42	Female	LEFT	External Fixation	Good
30	51	Male	LEFT	External Fixation	Good
31	37	Male	RIGHT	Internal Fixation	Fair
32	32	Male	RIGHT	Internal Fixation	Good
33	27	Male	LEFT	Internal Fixation	Excellent
34	45	Male	LEFT	External Fixation	Fair
35	38	Male	LEFT	Internal Fixation	Good
36	36	Male	LEFT	External Fixation	Good
37	26	Male	LEFT	Internal Fixation	Good
38	27	Male	RIGHT	Internal Fixation	Fair
39	25	Male	LEFT	Internal Fixation	Good
40	56	Male	LEFT	External Fixation	Good
41	27	Male	LEFT	External l Fixation	Fair
42	33	Male	RIGHT	External Fixation	Good
43	37	Male	LEFT	External Fixation	Good
44	56	Male	LEFT	External Fixation	Good
45	23	Male	RIGHT	External Fixation	Good
46	55	Male	RIGHT	Internal Fixation	Fair
47	21	Male	LEFT	External Fixation	Good
48	57	Male	RIGHT	Internal Fixation	Good
49	27	Male	RIGHT	External Fixation	Fair
50	18	Male	LEFT	Internal Fixation	Good

51	53	Male	RIGHT	External Fixation	Good
52	28	Male	RIGHT	External Fixation	Good
53	26	Male	LEFT	External Fixation	Good
54	33	Male	RIGHT	Internal Fixation	Good
55	22	Male	RIGHT	External Fixation	Good
56	18	Male	LEFT	External Fixation	Fair
57	19	Male	RIGHT	External Fixation	Fair
58	19	Male	RIGHT	Internal Fixation	Good
59	27	Male	LEFT	External Fixation	Good
60	46	Male	RIGHT	External Fixation	Fair
61	26	Male	RIGHT	External Fixation	Fair
62	38	Male	LEFT	Internal Fixation	Good
63	65	Male	RIGHT	External Fixation	Fair
64	39	Male	LEFT	Internal Fixation	Good
65	18	Male	RIGHT	External Fixation	Poor
66	34	Male	RIGHT	Internal Fixation	Good
67	37	Male	RIGHT	Internal Fixation	Good
68	39	Male	RIGHT	Internal Fixation	Good